

National Park Service
U.S. Department of the Interior

Point Reyes National Seashore
California



Final Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit

November 2012

Cover Photo by: Robert Campbell

**Final Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit
Point Reyes National Seashore
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November 2012**

Lead Agency: National Park Service (NPS), U.S. Department of the Interior

Cooperating Agencies: California Department of Fish and Game (CDFG), U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA-NMFS), and U.S. Environmental Protection Agency (EPA)

The NPS has used the NEPA process to engage the public to evaluate the effects of issuing a Special Use Permit (SUP) for the commercial shellfish operation of Drakes Bay Oyster Company at Point Reyes National Seashore. As the culmination of the NEPA process, the NPS is making available the Final Environmental Impact Statement (EIS) assessing four alternatives and identifying the environmentally preferable alternative. However, it should be noted that Section 124 of Public Law 111-88 provides that the Secretary's decision whether to issue this permit is "notwithstanding any other provision of law." As such, the NPS has not identified a preferred alternative in the Final EIS.

The Final EIS describes and analyzes four alternatives for federal action related to the operation of DBOC within Point Reyes National Seashore (the Seashore). On October 30, 2009, Congress enacted Section 124 of Public Law (PL) 111-88, which provides to the Secretary of the Interior (Secretary) the discretionary authority to issue a new SUP to DBOC for a period of 10 years. The discretionary authority contained in section 124 now allows the Secretary to permit DBOC's operations for a new 10 year term, until November 30, 2022. The EIS presents a no-action alternative, which considers expiration of existing authorizations and subsequent conversion of the area to congressionally designated wilderness, and three action alternatives, which consider the issuance of a new SUP to DBOC for a period of 10 years with differing levels of onshore facilities and infrastructure and offshore operations.

Alternative A, No New Special Use Permit – Conversion to Wilderness (No-action) considers the expiration of the existing RUO and SUP and subsequent conversion to wilderness consistent with PL 94-567. The existing SUP and RUO expire on November 30, 2012. Under alternative A, the Secretary would not exercise the discretion granted to him under section 124 to issue a new 10-year SUP. Upon cessation of the nonconforming use from Drakes Estero, NPS would convert the area to wilderness. The three action alternatives describe differing levels of onshore facilities and infrastructure and offshore operations associated with the issuance of a new SUP for a period of 10 years.

Alternative B, Issue New Special Use Permit - Existing Onshore Facilities and Infrastructure and Offshore Operations Would be Allowed for a Period of 10 Years, considers a level of use consistent with conditions that were present in fall 2010 when NPS initiated evaluation under the EIS. The existing SUP and RUO expire on November 30, 2012. The Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022.

Alternative C, Issue New Special Use Permit - Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would be Allowed for a Period of 10 Years, considers a level of use that was occurring at the time the current SUP was signed in April 2008. The existing SUP and RUO expire on November 30, 2012. Under alternative C, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022.

Alternative D, Issue New Special Use Permit - Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years, considers expansion of operations and development of new infrastructure as requested by DBOC as part of the EIS process. The existing SUP and RUO expire on November 30, 2012. Under alternative D, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022.

The Draft EIS was available for public and agency review and comment between September 23, 2011 and December 9, 2011. An electronic copy of the Draft EIS was posted at www.parkplanning.nps.gov/PORE. Copies of the document were distributed to individuals, agencies, and organizations, and were available in local public libraries, at the public meetings, and upon request. This Final EIS provides responses to substantive agency and public comments, and incorporates those comments and suggested revisions, where necessary.

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EXECUTIVE SUMMARY

The Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP) presents four alternatives. The no-action alternative considers expiration of existing authorizations and subsequent conversion of the area to congressionally designated wilderness. Three action alternatives consider the issuance of a new SUP to DBOC for a period of 10 years with differing levels of onshore facilities and infrastructure and offshore operations. Beneficial and adverse impacts are assessed for all four alternatives evaluated in this EIS. Existing authorizations for DBOC to operate expire November 30, 2012. The National Environmental Policy Act of 1969 (NEPA), as amended, process is being used to inform the decision of whether a new SUP should be issued. If a new SUP is issued, it would authorize DBOC to operate its onshore and offshore¹ operations until November 30, 2022. In the event that a new SUP is issued, it would incorporate all of DBOC's National Park Service (NPS) authorized onshore and offshore operational requirements. There is no authority to issue or extend a reservation of use and occupancy (RUO).

The authority for NPS to issue a new permit to DBOC came about as a result of congressional action. On October 30, 2009, Congress enacted section 124 of Public Law (PL) 111-88, which was part of the Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010. Section 124 states:

Prior to the expiration on November 30, 2012, of the Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit ("existing authorization") within Drakes Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012: Provided, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. (Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010, Pub. L. No. 111-88, section 124, 123 Stat. 2904, 2932 [2009])

Section 124, as it will be referred to in this EIS, provides to the Secretary of the Interior (Secretary) the discretionary authority to issue a new SUP to DBOC for a period of 10 years. Congress granted the Secretary the discretionary authority contained in section 124 in response to NPS's determination that it

¹ In this document, the term offshore is used to refer to operations and facilities in Drakes Estero, including waters, tide and submerged lands, and intertidal areas such as the shoreline and mudflats.

lacked authority to allow DBOC to operate after November 30, 2012. PL 94-544 and PL 94-567 of 1976 designated Drakes Estero as potential wilderness. House Report 94-1680, which accompanied the public law, provided that, “it is the intention that those lands and waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status.” The commercial shellfish operation in Drakes Estero, now operated by DBOC, is the only nonconforming use that prevents conversion of the waters of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The discretionary authority contained in section 124 now allows the Secretary to permit DBOC’s operations for a new 10 year term, until November 30, 2022.

PURPOSE OF AND NEED FOR ACTION

PURPOSE AND NEED

Action is needed at this time because pursuant to section 124 of Public Law 111-88, the Secretary has the discretionary authority to issue a SUP for a period of 10 years to DBOC for its shellfish operation, which consists of commercial production, harvesting, processing, and sale of shellfish at Point Reyes National Seashore. The existing RUO and SUP held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing authorizations. Consistent with Department of the Interior (DOI) NEPA regulations (43 CFR 46.30), the proposed action for this EIS is the Secretary’s decision whether to issue a permit under section 124.

The purpose of the document is to use the NEPA process to engage the public and evaluate the effects of issuing a SUP for the commercial shellfish operation. The NEPA process will be used to inform the decision of whether a new SUP should be issued to DBOC for a period of 10 years.

PROJECT OBJECTIVES

Project objectives build from the project purpose and identify those goals that are “critical to meet if NPS is to consider the proposal successful” (NPS 2001b). Project objectives should be grounded in the park’s enabling legislation, purpose, significance, and mission goals; as well as relevant legislation; NPS plans (such as general management plans [GMPs]); or other NPS standards and guidelines. Project objectives should be broad enough to allow for a reasonable range of alternatives without narrowing the focus or intentionally excluding an alternative. The following project objectives have been identified:

- Manage natural and cultural resources to support their protection, restoration, and preservation.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
- Provide opportunities for visitor use and enjoyment of park resources.

DBOC GOALS

On July 6, 2010, DBOC submitted a request for the issuance of a new SUP upon expiration of the existing permit. Specifically, DBOC seeks to “occupy and utilize the buildings and lands on the shores of Drakes Estero” (Latham & Watkins, LLP 2010). DBOC requested that the EIS consider DBOC’s needs and goals, as the project applicant. DBOC requested that its objective of “operating an environmentally-friendly and sustainable oyster farm for a renewable 10-year period under a Service-issued SUP” be included both during scoping as well as during public review of the Draft EIS (DBOC 2010n, 2011i). DBOC also requested that the purpose and need be modified “to reference DBOC’s request that the renewed SUP be issued under [the] same terms and conditions present in the RUO/SUP, for permission to complete work authorized under the 1998 Environmental Assessment, and for permission to make select physical improvements.” DBOC suggested that language regarding discussion of mitigation measures and historical context be added to the purpose and need, as well (DBOC 2011i).

The goals provided by DBOC are included here as background information. DBOC’s goals have not been added to the NPS purpose, need, and objectives because doing so would limit the range of reasonable alternatives to only those that further DBOC’s goals, which may not reflect the broader public interest, and would be inconsistent with the Secretary’s discretion under section 124.

Specifically, DBOC’s goal that NPS issue a “renewable” SUP is not consistent with section 124, which authorizes only one, 10-year permit term. Similarly, DBOC’s goal that the new permit be limited to its onshore operations only is inconsistent with section 124, which specifies that a new permit must mirror the terms of the existing permit. DBOC’s existing SUP authorizes onshore and offshore operations, consistent with NPS’s jurisdiction over Drakes Estero. A new permit issued under section 124 would therefore authorize both onshore and offshore operations.

BACKGROUND

The original Drakes Bay Oyster Company (no relation to the present day DBOC) operated on the banks of Drakes Estero near the head of Schooner Bay, from 1938 to 1945 (Caywood and Hagen 2011). In 1946, the Drakes Estero oyster allotment was transferred to Larry Jensen (Caywood and Hagen 2011). During the Jensen tenure, the ownership of the 5-acre parcel containing the processing plant was integrated with the state water allotment lease in Drakes Estero. In April 1954, Larry Jensen entered into an “agreement of sale” with Van Camp Seafood for his oysters, state oyster allotments, and the 5 acres of upland real property that accompanied the state water bottom leases. In turn, it was quickly transferred to the Coast Oyster Company (Caywood and Hagen 2011; CDFG 1954, 1955). In 1958, Charles W. Johnson took over the oyster operation in Drakes Estero and soon founded the Johnson Oyster Company (JOC). Mr. Johnson cultivated shellfish (mostly oysters) in Drakes Estero and operated onshore processing facilities from 1961 through 2003. Mr. Johnson purchased 5 acres of onshore land where the existing processing facilities were located in 1961. He and his wife moved to the oyster plant at Creamery Bay.

Although the Seashore was established in 1962, NPS did not acquire ownership of all lands and waters within the Seashore’s boundary immediately. In 1965, the state-held water bottoms of Drakes Estero were conveyed to NPS by the State of California. In 1972, NPS purchased fee title to the 5-acre upland parcel where the oyster processing facilities were located from Mr. Johnson. As part of the purchase agreement, Mr. Johnson elected to

retain a 40-year RUO over 1.5 acres of the 5-acre parcel. The RUO allowed for “processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation to the visiting public and residential purposes reasonably incidental thereto” (NPS 1072a).

In December 2004, DBOC purchased the assets of JOC, assuming the remaining seven years of the RUO and SUP that NPS had issued to JOC for the well and septic leach field (DBOC 2011f⁴). There were no changes to the terms of the RUO or to its expiration date. In April 2008, DBOC and NPS signed a SUP (NPS Permit No. MISC-8530-6000-8002) that would allow the commercial shellfish operation in Drakes Estero to remain, with provisions, until November 30, 2012, when it expires concurrently with the RUO.

DESCRIPTION OF THE PROJECT AREA

The Seashore is located in western Marin County in central California, approximately 30 miles northwest of San Francisco and within 50 miles of the nine-county San Francisco Bay Area, the fifth largest metropolitan area in the United States. The Seashore is bounded to the north, west, and southwest by the Pacific Ocean and to the east by the residential communities of Inverness, Inverness Park, Point Reyes Station, Olema, and Dogtown. Western Marin County is primarily rural, with scattered, small, unincorporated towns that serve tourism, agriculture, and local residents. In addition, the Seashore administers the Northern District of the Golden Gate National Recreation Area, adjacent to the Seashore, for a combined management area and legislated boundary of approximately 94,000 acres (figure ES-1).

Drakes Estero is a system of five branching bays encompassing approximately 2,500 acres. The branching bays are stretched to the north and separated by low converging ridges. From west to east, they are: Barries Bay, Creamery Bay, Schooner Bay, Home Bay, and Estero de Limantour (see figures ES-1 and ES-2). Nearly half of the Estero’s surface area consists of mud and sand flats that are exposed at low tide (Press 2005). Because of the shallow character of the bay, and its tendency to flush completely within a normal tidal cycle, currents in the main stem and secondary channels are relatively strong.

The Drakes Estero watershed covers approximately 31 square miles, including Drakes Estero itself (Baltan 2006). The Seashore leases most of the lands surrounding Drakes Estero for cattle grazing (approximately 14 square miles within the watershed). Areas draining to and surrounding the Estero de Limantour are primarily within congressionally designated wilderness (approximately 8 square miles within the watershed).

This EIS examines DBOC operations and facilities in and adjacent to Drakes Estero. The project area is roughly 1,700 acres and includes DBOC structures, facilities, and operations in much of the congressionally designated potential wilderness (1,363 acres), 2.6 acres of onshore property, and 2 acres incorporating the well and septic areas, as delineated in the RUO and SUP (see figures 1-3 and 1-4). In order to provide a comprehensive analysis of potential impacts of the alternatives presented in this EIS, the project area also includes the kayak launch parking area and the access road leading from Sir Francis Drake Boulevard. All land and water portions of the project area are owned by NPS. Resources outside the project area may be described if they are subject to impacts resulting from any of the proposed alternatives. The project area as a whole is depicted on figure ES-2, with figures ES-3 and ES-4 showing the detailed location of the onshore operations.



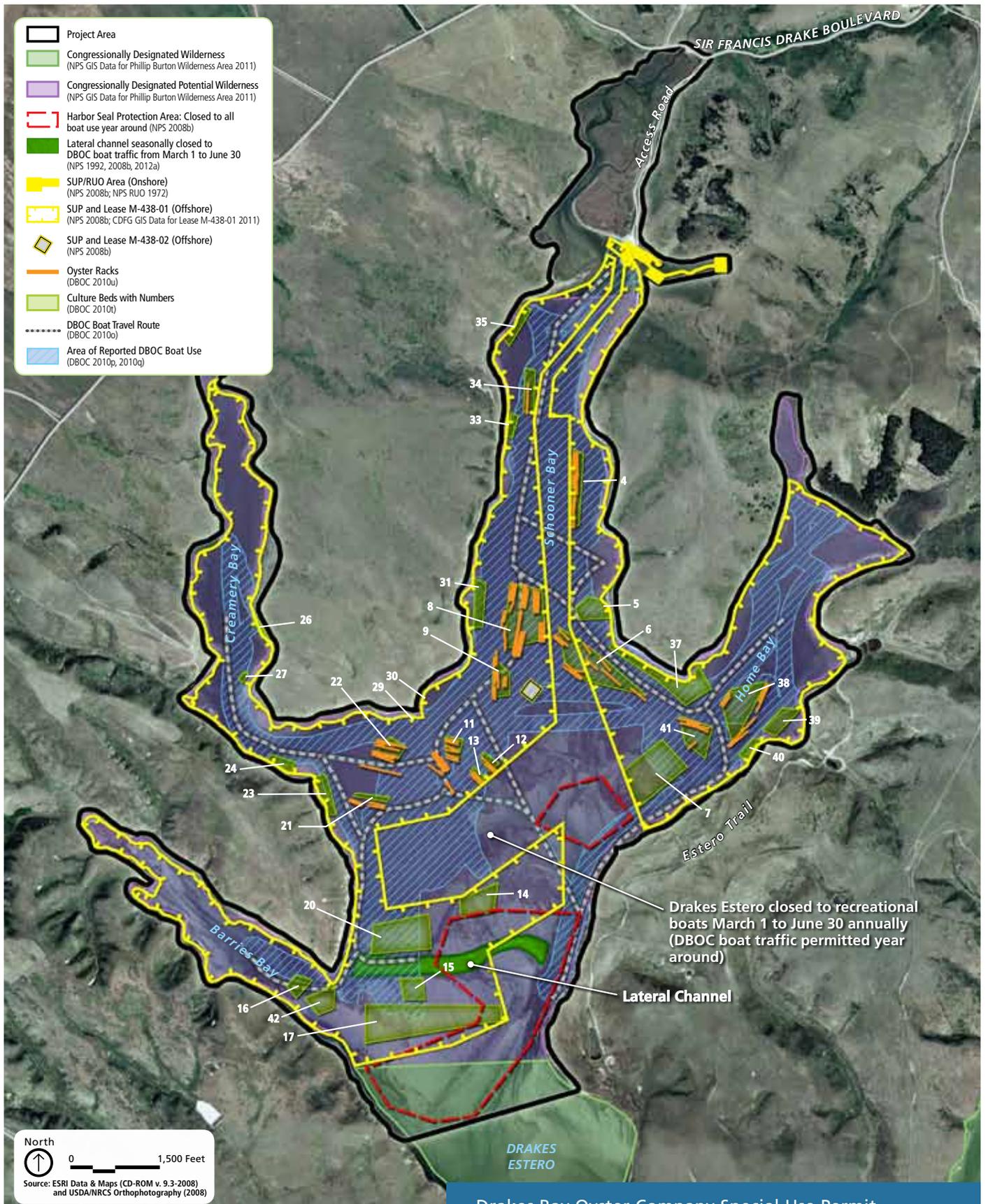
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**FIGURE ES-1
Project Location Map**



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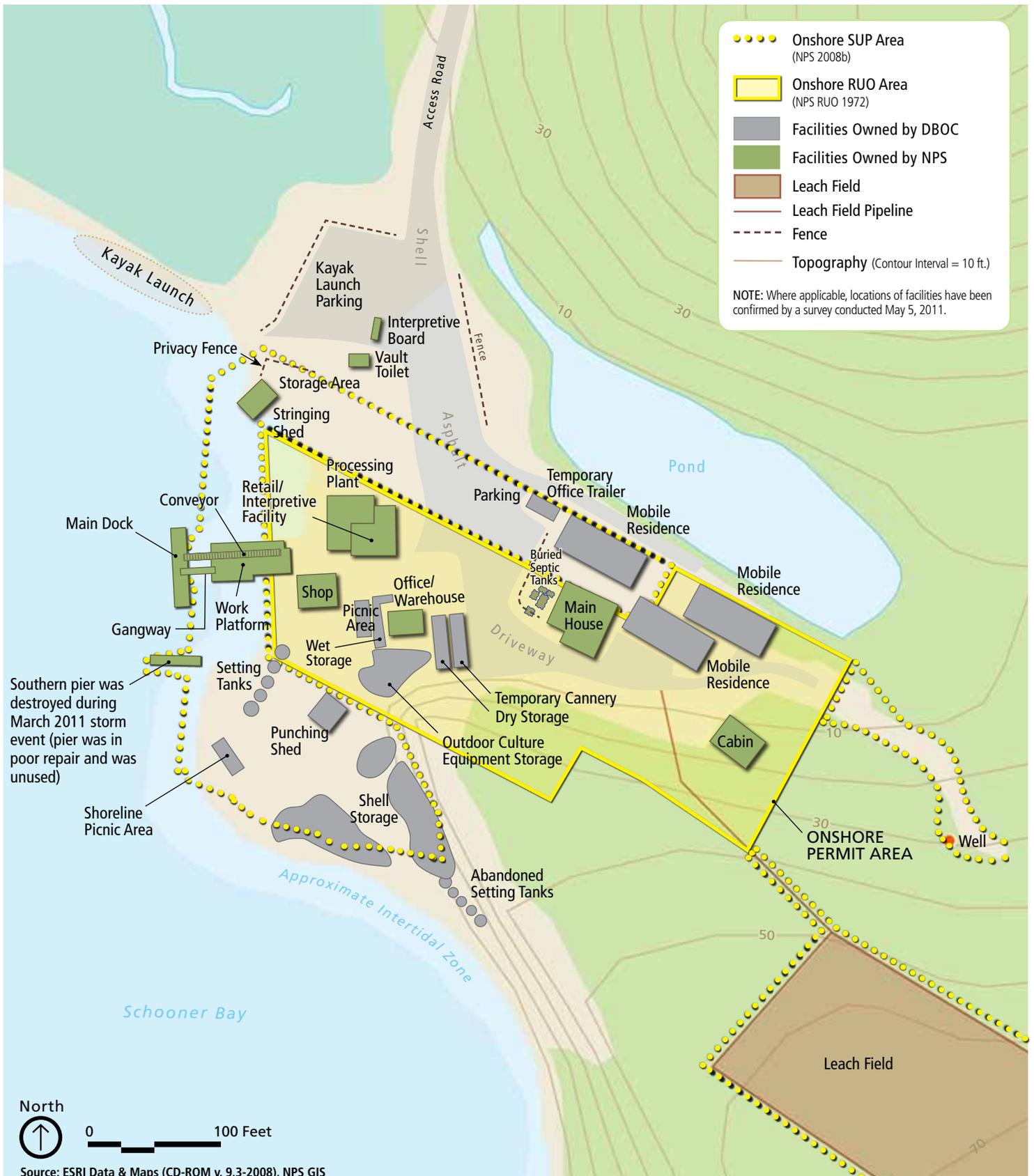
Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

**FIGURE ES-2
Existing Conditions (Offshore Operations)**

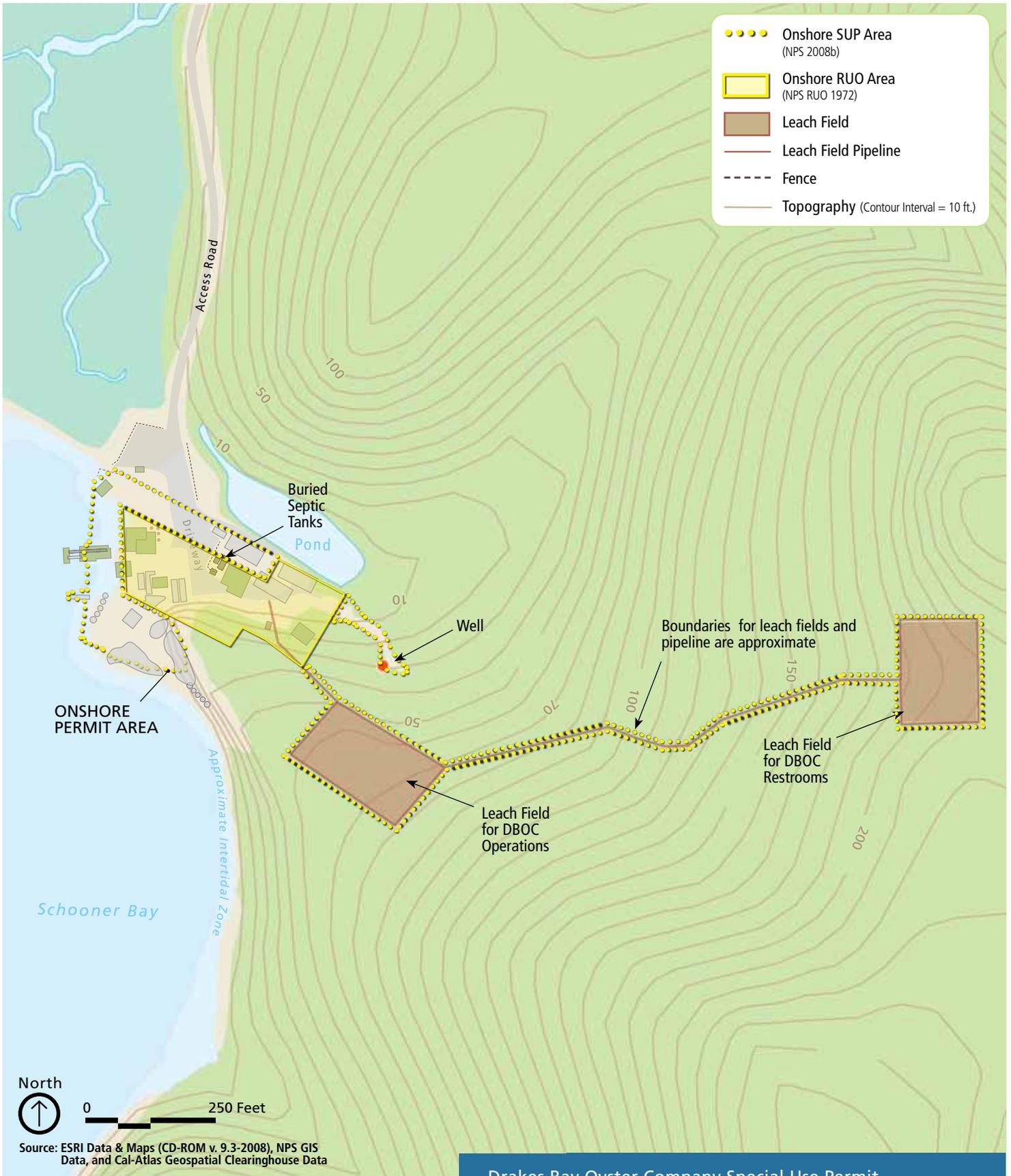


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- Onshore SUP Area (NPS 2008b)
- Onshore RUO Area (NPS RUO 1972)
- Leach Field
- Leach Field Pipeline
- - - Fence
- Topography (Contour Interval = 10 ft.)

Drakes Bay Oyster Company Special Use Permit
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Source: ESRI Data & Maps (CD-ROM v. 9.3-2008), NPS GIS Data, and Cal-Atlas Geospatial Clearinghouse Data

EXISTING DBOC OPERATIONS

DBOC's operations occur on uplands adjacent to Drakes Estero and on tide and submerged lands within the Estero. All of the upland, tidal, and submerged lands on which DBOC conducts its operations are located within the Seashore and are owned in fee by the United States. Pursuant to 36 CFR 1.2, activities occurring on lands and waters under the jurisdiction of NPS are subject to applicable NPS laws and regulations.

DBOC currently grows two species of shellfish: Pacific oyster and manila clam. The 2008 SUP authorized DBOC to generally operate within the same offshore boundaries as contained in Lease M-438-01 (1,049 acres)² and Lease M-438-02 (1 acre). Within the offshore lease boundaries, DBOC maintains 142 acres of shellfish growing areas. Shellfish growing areas are otherwise known as "culture beds" or simply "beds" and can include any of the shellfish cultivation methods. The 142 acres comprise 42 numbered culture beds (see figure ES-2). DBOC cultivates shellfish using three primary methods: hanging culture, floating culture, and bottom culture. Oysters are grown using all three methods. Manila clams are grown using bottom bag culture. DBOC maintains 95 wooden racks for cultivation, which total approximately 5 miles when laid end-to-end (also expressed as 7 acres), within Drakes Estero. Currently, six of these racks fall outside the permit boundaries. Additional detail about DBOC's offshore facilities are described in chapter 2 of the EIS.

DBOC onshore facilities support the processing, sale, and initial stages of shellfish culture (see figure ES-3). For the most part, these facilities are located within the 1.5 acres of the original RUO, the additional 1.1 acres established with the issuance of the 2008 SUP, and 2.0 acres encompassing the well and septic areas (shown on figure ES-4). DBOC packages its shellfish on site and operates the only on-site shellfish cannery in California. DBOC facilities currently outside the authorized area include unused setting tanks and may also include portions of the oyster shell storage mounds. See chapter 2 of the EIS for additional detail related to DBOC's onshore facilities.

ISSUES AND IMPACT TOPICS

Many resources and activities have the potential to be affected by either issuing or not issuing a SUP for continued commercial shellfish operations within the Seashore. These resources were initially identified by NPS staff during internal scoping and were further refined through the public and agency scoping process. Some impact topics were considered but dismissed from further analysis because either (a) the resources do not exist in the project area or would not be impacted by the project or (b) impacts would be less than minor³. The tables below outline the issues and impact topics retained for further analysis (table ES-1) and those that were considered but dismissed (table ES-2), and the rationale for doing so. Impact topics retained for detailed analysis within the EIS include wetlands and other waters of the U.S., eelgrass, wildlife and wildlife habitat, special-status species - California coast Coho salmon

² Since the consolidation of several allotments into Lease M-438-01 in 1979, the lease language has specified that the lease area is made up of two parcels totaling approximately 1,059 acres; however, the geographic information system (GIS) data provided by CDFG in 2011 for this lease area measures 1,049 acres. For the purposes of this EIS, all area calculations are based on GIS data. Therefore, the latter measurement is used to represent existing conditions throughout this EIS.

³ Minor impacts are generally defined as being slight but detectable, typically short-term and localized.

(*Oncorhynchus kisutch*) and central California coast steelhead (*O. mykiss*), coastal flood zones, water quality, soundscapes, wilderness, visitor experience and recreation, socioeconomic resources, and NPS operations. Dismissed topics include vegetation, special-status species – silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog (*Rana aurora draytonii*), leatherback sea turtle (*Dermochelys coriacea*), western snowy plover (*Charadrius alexandrinus nivosus*), and California least tern (*Sterna antillarum browni*), water quantity, lightscapes, air quality, climate change and greenhouse gas emissions (carbon footprint), local food, geological resources, paleontological resources, cultural resources, and environmental justice.

TABLE ES-1. ISSUES AND IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

Issue/Impact Topic	Rationale for Retention
Wetlands and Other Waters of the U.S.	<p>The identification of wetlands within the project area is necessary to ensure their protection in accordance with federal laws (section 404 of the Clean Water Act [CWA] and the Rivers and Harbors Act of 1899) and state laws (e.g., the California Coastal Act of 1976). NPS <i>Management Policies 2006</i> states that NPS will implement a “no net loss of wetlands” policy and will (1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands (NPS 2006d). Guidance related to the management of wetlands is further clarified by Director’s Order 77-1: <i>Wetland Protection</i> (DO-77-1) (NPS 2002a). As defined by the U.S. Army Corps of Engineers (USACE) and the U.S. Fish and Wildlife Service (USFWS), wetland areas and other waters of the U.S. exist in the project area, both within Drakes Estero and along the shoreline where natural conditions persist. DBOC operations may have the potential to impact these wetlands through placement of materials (such as bags and trays) directly in wetlands, trampling of vegetated wetlands, and shading associated with racks, as well as people walking across mudflats, and propellers and boat hulls scraping the mud bottom. The impact topic of wetlands and other waters of the U.S. is retained for detailed analysis in this EIS.</p>
Eelgrass	<p>In Drakes Estero, eelgrass (<i>Zostera marina</i>) is the dominant form of submerged aquatic vegetation and is present throughout Drakes Estero in dense beds. Eelgrass beds provide important foraging and feeding ground for many aquatic organisms, they serve as the base of the food web in many coastal habitats, and they perform important environmental functions, such as trapping sediment, taking up excess nutrients, and protecting shorelines from erosion. Eelgrass beds are classified as a type of “special aquatic site,” a category of “Waters of the United States” afforded additional consideration under the Clean Water Act section 404 (b)(1) guidelines developed by the Environmental Protection Agency (EPA). Special aquatic sites possess characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These sites are recognized as significantly influencing or positively contributing to the overall environmental health or vitality of the entire ecosystem of a region. DBOC operations in Drakes Estero and the eelgrass beds interact “via changes each makes to the immediate environment like altering water flow, sediment structure, light penetration, and nutrient supply. Other environmental changes arising from mariculture come from the addition of structures (e.g., bags, racks, and lines) and disturbances of transportation and culture operations” (NAS 2009). The termination or continuation of these activities related to DBOC operations could beneficially or adversely impact eelgrass. Therefore, the impact topic of eelgrass is retained for detailed analysis in this EIS.</p>

TABLE ES-1. ISSUES AND IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Retention
Wildlife and Wildlife Habitat	Drakes Estero provides habitat for multiple native wildlife species, including benthic fauna (animals living on or in the submerged substrate), fish, harbor seals, and birds. Drakes Estero also includes privately owned species cultivated by DBOC, as well as nonnative invasive species such as the tunicate, <i>Didemnum vexillum</i> and the mud snail, <i>Batillaria attramentaria</i> . Commercial shellfish operations could potentially impact these species and their habitat through habitat competition, habitat improvement or degradation, noise and physical disruptions, and introduction of nonnative species. The impact topic of wildlife and wildlife habitat is retained for detailed analysis in this EIS.
Special-Status Species	The Endangered Species Act (ESA) mandates that all federal agencies consider the potential impacts of their actions on species listed as threatened or endangered in order to protect the species and preserve their habitats. Potential impacts are assessed within an "action" area, which can be larger than individual project areas, and are determined by evaluating the geographic extent of potential environmental changes (i.e., biological, chemical, and physical effects). USFWS and the U.S. National Marine Fisheries Service (NMFS) Division of the National Oceanic and Atmospheric Administration (NOAA) share responsibility for implementing the ESA. Per informal consultations with USFWS in 2010 and previous studies, seven federally listed threatened and endangered species and/or their critical habitat were identified for consideration. After further consultation with USFWS and NMFS and further review of the available and relevant scientific literature, only two species and/or their critical habitat were identified as potentially affected by activities within the project/action area. These include central California coast Coho salmon (<i>Oncorhynchus kisutch</i>) and central California coast steelhead (<i>O. mykiss</i>). The Coho salmon also is a state-listed species. Based on the location of DBOC's offshore operations relative to these fish species and/or their critical habitat, and resultant threats to those protected resources, the impact topic of special-status species is retained for detailed analysis in this EIS. For a description of the five special-status species that were considered but dismissed from further analysis, please see table ES-2 below.
Coastal Flood Zones	Pursuant to Director's Order 77-2: <i>Floodplain Management</i> (DO-77-2), the NPS must strive to preserve floodplain values and minimize hazardous floodplain conditions (NPS 2003a). Although no formal floodplain mapping has been undertaken at the planning site, a topographic survey was performed at the onshore facilities based on North American Vertical Datum of 1988 (NAVD-88). Direct observations of flooding made it necessary to survey the area for elevations, so the impact topic of coastal flood zones could be reasonably evaluated. The purpose of the survey was to verify the topographic elevations of the onshore features and correlate those elevations to elevations associated with flood events. Further, it has been observed that some buildings associated with DBOC operations have been prone to flooding during high tide and storm events. Within a 2006 California Department of Public Health (CDPH) report, it was noted that "during extreme hydrographic conditions, Estero water floods into the oyster company's plant area. Extreme high tides (over 6 feet), rainfall and winds can all combine to bring water over the Estero banks and into the DBOC plant area. This occurs once or twice a year (Kevin Lunny, pers. comm.)" (Baltan 2006). In addition, NOAA identifies regions subject to potential tsunami inundation, and Drakes Estero falls within the tsunami inundation zone (State of California Emergency Management Agency 2009). Placement of structures within the 100-year floodplain is inconsistent with NPS floodplain management policies, and the continued presence of these structures in the floodplain has the potential to impact floodplain values, DBOC facilities, and the safety of those employees living in structures within the coastal flood zone. The impact topic of coastal flood zones is retained for detailed analysis in this EIS.

TABLE ES-1. ISSUES AND IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Retention
Water Quality	<p>DBOC commercial shellfish operations within and adjacent to Drakes Estero have the potential to impact both surface and groundwater quality. Nonpoint sources of pollution specific to land development and the commercial shellfish operations include onshore impervious stormwater runoff, boat operation, pulse disturbances to the Estero substrate from maintaining oyster racks and placing/overturning/removing bottom bags in Drakes Estero, accidental spill of fuel/oil, and accidental spill/leaks of wastewater from underground septic tanks. In addition, water used to clean the oysters and other discharges from sources used in the cultivation process may contribute to water quality impacts. Floating debris (plastic tubing, bags, piping, etc.) associated with the commercial shellfish operation may also impact water quality. As identified during public scoping, shellfish cultivation in Drakes Estero (specifically the presence of filter-feeding organisms) may result in beneficial impacts on water quality. The impact topic of water quality is retained for detailed analysis in this EIS.</p>
Soundscapes	<p>In accordance with NPS <i>Management Policies 2006</i> and Director's Order 47: <i>Soundscape Preservation and Noise Management</i> (DO-47), an important part of the NPS mission is preservation of natural soundscapes within units of the national park system (NPS 2006d, 2000). Natural soundscapes "encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. Natural sounds occur within and beyond the range of sounds that humans can perceive, and they can be transmitted through air, water, or solid materials" (NPS 2006d). As identified during public scoping, components of DBOC operations, such as motorized boats and onshore equipment, create noise that may impact park visitors and wildlife and disturb the natural soundscape of the area. The impact topic of soundscapes is retained for detailed analysis in this EIS.</p>
Wilderness	<p>A wilderness area is defined, in part, as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. . . . An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation" (PL 88-577). Pursuant to PL 94-544 and 94-567, Congress designated the waters of Drakes Estero as potential wilderness. Drakes Estero was designated as potential wilderness rather than full wilderness due to the presence of the commercial oyster operation, a nonconforming use. Cessation of DBOC's commercial operations upon expiration of existing authorizations would allow the congressionally designated potential wilderness to be converted to congressionally designated wilderness. Conversely, should a new SUP be issued, the area would remain as congressionally designated potential wilderness for another 10 years. The impact topic of wilderness is retained for detailed analysis in this EIS.</p>
Visitor Experience and Recreation	<p>The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in park units. During public scoping it became evident that some visitors to the Seashore view the commercial shellfish operation as an integral part of their visit, while other visitors view the commercial operation as an adverse impact on their enjoyment of solitude and the natural setting and resources of the site, as well as their wilderness experience. For those visitors that view the commercial shellfish operation as an integral part of their visit to the Seashore, expiration of existing authorizations may reduce the satisfaction of these visitors, because they would no longer be able to purchase oysters or interact with DBOC staff. On the other hand, if a new 10-year SUP is issued to DBOC to continue its commercial shellfish operation, Seashore visitors seeking to experience the wilderness of Drakes Estero, as defined by the Wilderness Act of 1964 as, "outstanding opportunities for solitude or a primitive and unconfined type of recreation," would be adversely affected. Therefore, the impact topic of visitor experience and recreation is retained for detailed analysis in this EIS.</p>

TABLE ES-1. ISSUES AND IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Retention
Socioeconomic Resources	As part of the NEPA process, the NPS assesses the impacts of each alternative on socioeconomic resources. Expiration of the existing RUO and associated SUP and termination of DBOC's commercial operations could result in adverse impacts on the current staff and on DBOC, as well as on the regional economy and statewide shellfish production. The impact topic of socioeconomic resources is retained for detailed analysis in this EIS.
NPS Operations	Each of the proposed alternatives could result in changes to Seashore operations and infrastructure near and within Drakes Estero. Seashore staff and available funding are key elements to promoting and protecting natural and cultural resources within the Seashore. Issuance of a new SUP to DBOC would require improved SUP monitoring and enforcement by Seashore staff, including review of proposed changes at DBOC and coordination with other state and local agencies. The impact topic of NPS operations is retained for detailed analysis in this EIS.

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

Issue/Impact Topic	Rationale for Dismissal
Vegetation	Vegetation cover types within the Drakes Estero watershed include wetlands, coastal dune, coastal scrub, grassland, pasture, and riparian woodland. Coastal scrub and wetlands are the only vegetation types that exist within the immediate project area. Several rare plants (see appendix E of the EIS) are known to exist within these habitat types. Wetlands are discussed as a separate impact topic, because there is the potential for these resources to be impacted by the alternatives considered in this EIS. The coastal scrub vegetation cover type is present around the onshore DBOC facilities and along the main access road. The proposed alternatives would not directly impact the coastal scrub vegetation. The rare plants known to exist in the area (based on inventory data provided by the NPS) would not be impacted by the project as they are located within areas that are outside the area of direct and indirect impacts, including some of the adjacent coastal scrub areas and within vegetated intertidal (NPS 2010f). Therefore, the impact topic of vegetation is dismissed from further analysis in this EIS.
Special-status Species	As mentioned in table ES-1, seven federally listed threatened and endangered species were identified for consideration. Five of these species have been dismissed from further analysis in the EIS due to a lack of designated critical habitat in the project/action area, unconfirmed presence of the species in the project/action area, or the potential for less than minor impacts on the species and/or their critical habitat. These include Myrtle's silverspot butterfly (<i>Speyeria zerene myrtleae</i>), California red-legged frog (<i>Rana aurora draytonii</i>), leatherback sea turtle (<i>Dermochelys coriacea</i>), western snowy plover (<i>Charadrius alexandrinus nivosus</i>), and California least tern (<i>Sternula antillarum browni</i>). A brief explanation of the justification for dismissal for each species is provided below.

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>Myrtle's Silverspot Butterfly (<i>Speyeria zerene myrtleae</i>). Myrtle's silverspot butterfly was federally listed as endangered in 1992 (USFWS 1992). The historic range of the butterfly in California is believed to have extended from the mouth of the Russian River in Sonoma County to Point Año Nuevo in San Mateo County (Launer et al. 1992). Typical habitat for Myrtle's silverspot butterfly and its host plant includes coastal dunes, coastal scrub, or coastal prairies that are protected from wind, at elevations from sea level to 1,000 feet, up to 3 miles inland (USFWS 1998).</p> <p>Plant species at the Seashore known to attract adult Myrtle's silverspot butterfly include western dog violet (<i>Viola adunca</i>), curly-leaved monardella (<i>Monardella undulata</i>), yellow sand-verbena (<i>Abronia latifolia</i>), seaside daisy (<i>Erigeron glaucus</i>), bull thistle (<i>Cirsium vulgare</i>), gum plant (<i>Grindelia</i> spp.), and mule ears (<i>Wyethia</i> spp.). Of these, the western dog violet serves as the host plant (i.e., the plant on which females lay eggs) and is the only known food plant used by butterfly larva once they emerge from eggs. Other flowering plants provide nectar sources for adult butterflies (USFWS 2009).</p> <p>Coastal scrub habitat surrounds the DBOC onshore facilities and entry road. Surveys conducted in 2003 verified the presence of butterfly populations within the Seashore and the butterfly has been documented on grasslands surrounding the project area (USFWS 2009). However, records do not indicate that Myrtle's silverspot butterfly exists within the project/action area. If species were present in the project area, threats such as the potential for vehicle strikes/mortality would be less than minor due to the slow speeds and low usage of the access road.</p> <p>California Red-legged Frog (<i>Rana aurora draytonii</i>). The California red-legged frog was listed as federally threatened in 1996 (USFWS 1996). Revised critical habitat for this species was designated in 2010 (USFWS 2010). The frog requires a variety of habitats for normal biological activity, including aquatic breeding areas, riparian habitat, and upland dispersal habitats used during migration between breeding areas. Aquatic breeding habitats include pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds, and lagoons. Additionally, California red-legged frogs frequently breed in artificial impoundments, such as stock ponds (USFWS 2002b). Historically, the frog has been observed at elevations ranging from sea level to 5,200 feet above sea level, but it has been extirpated (eliminated) in 70 percent of its former range.</p> <p>Since 1993, the U.S. Geological Survey Biological Resources Division has conducted surveys of aquatic amphibian habitat in the Seashore. The surveys have identified more than 120 California red-legged frog breeding sites within the Seashore, supporting a total adult population of several thousand frogs (NPS 2007a). Approximately two-thirds of the breeding sites are on ranch lands, with a large proportion occurring at stock ponds used by ranchers. Based on survey data, important habitat for red-legged frogs also includes streams with relatively low gradients that have late-season water flow or water retention in pools. On Point Reyes Peninsula, such creeks support relatively few of the documented occurrences of the frogs, but may serve as important connectors to other breeding and refuge habitats. Examples of Seashore streams with this habitat are found in the Drakes Estero watershed.</p> <p>California red-legged frogs are documented in East Schooner, Home Ranch, Limantour, Glenbrook, Muddy Hollow, and Laguna creeks (USFWS 2008). In addition, the federally designated critical habitat encompasses the landward boundary of Drakes Estero. However, recent surveys and records do not indicate that the California red-legged frog exists within the project/action area. Due to the saline conditions of Drakes Estero, it is unlikely that the project/action area would serve as habitat for the California red-legged frog. Further, if the species were found to be present in the project area, the proposed actions of the onshore operations would be less than minor due to limited actions outside the existing developed footprint.</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>Leatherback Sea Turtle (<i>Dermochelys coriacea</i>). The leatherback sea turtle was listed as federally endangered in 1970 (USFWS 1970). Critical habitat was designated by NMFS in 2012 and although Drakes Estero is included in the geographic area designated as critical habitat (NMFS 2012a), further consultation with NMFS revealed that critical habitat for leatherback turtles does not extend into estuarine habitat (NMFS 2012b). As an estuary, Drakes Estero is therefore not included in the critical habitat designated for leatherback sea turtles. Leatherback sea turtle occurrences have not been recorded within the project/action area. Based on the nesting and foraging habitat requirements, it is unlikely that the turtles would use the shallow estuarine or land habitats associated with Drakes Estero.</p> <p>Western Snowy Plover (<i>Charadrius alexandrinus nivosus</i>). Western snowy plover was listed as federally threatened in 1993 (USFWS 1993). In 2005, the USFWS designated 12,145 acres of critical habitat for western snowy plover, including portions of Marin County. Based on federal reassessment of conservation needs proposed, updates to western snowy plover critical habitat were recommended in 2010, increasing the total acres of critical habitat to 28,261. Habitat for the plover includes beaches, dry mudflats, dry salt flats, and sandy shores. The plover nests on the ground in broad open spaces with sparse clumps of vegetation that allow protective cover for chicks. Nests also occur beside or under protective objects (Page et al. 2009). The plover's diet includes small insects, small crustaceans, and other minute vertebrates (Terres 1980).</p> <p>The western snowy plover uses the Point Reyes Peninsula as wintering and nesting habitat. During the 1980s, nesting took place along the entire Great Beach, on the far east end of Drakes Beach near the mouth of Drakes Estero, and at Limantour Spit. In recent years, erosion along the southern portion of Great Beach has diminished the upper beach area such that the entire beach can be washed by waves. Nesting is occurring on the northern portion of this beach, between the North Beach parking area and Kehoe Beach, which is backed by extensive dunes. Between 2001 and 2005, snowy plover nests were observed on this northern portion of Great Beach. Plovers also nest along the western edge of Abbotts Lagoon.</p> <p>Limantour Spit, the point at which Drakes Estero meets Drakes Bay, has historically been used as nesting habitat by plovers; however, no nests have been observed there since 2000 (Peterlein 2009). The nearest current areas of critical habitat include Limantour Spit and all the Seashore beaches lining the northwest shore of the Point Reyes Peninsula (USFWS 2011a). Despite the close proximity of critical habitat and nesting locations/habitat, there are no known records of western snowy plover observations within the project/action area, and potential impacts of proposed operations are considered negligible.</p> <p>California Least Tern (<i>Sternula antillarum browni</i>). The California least tern was listed as federally endangered in 1970 and state endangered in 1971 (USFWS 1985b). Least terns nest in loose colonies on relatively open beaches with no vegetation, along lagoon or estuary margins. Foraging habitat includes shallow estuaries or lagoons with abundant populations of small fish or other small prey. Terns usually dive for their prey and rest or loaf on sandy beaches and mudflats (NatureServe 2011). While no least terns are known to exist within the Seashore (including the project area), potentially suitable habitat types do exist. However, the nearest known population is located in the San Francisco Bay Area.</p>
Water Quantity	Impacts on fresh water quantity are related to the amount of ground water DBOC uses for wastewater and potable uses. The amount of well water used by DBOC does not noticeably impact the availability of fresh water in the area and was therefore not retained as an impact topic for further analysis in the EIS.

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
Lightscapes	<p>In accordance with NPS <i>Management Policies 2006</i>, the NPS strives to preserve natural ambient landscapes and other values that exist in the absence of human-caused light (NPS 2006d). There are two pole-mounted overhead lights within the project area to provide safety lighting after dark. Low levels of light also emanate from the DBOC residences. DBOC does not perform commercial shellfish operations after dark. In addition, visitor use of the area after dark is minimal. These low levels of light do not have a noticeable impact on natural resources or visitor enjoyment. Should DBOC require additional lighting in the future (if an action alternative is selected), then new lighting shall be designed to protect and preserve the night sky/darkness and minimize light pollution in Drakes Estero, as indicated by the SUP (NPS 2008b). Given the proximity of the project area to the San Francisco metropolitan area, the lightscape within the Seashore has already been degraded by the light pollution surrounding San Francisco. The impact topic of lightscapes is dismissed from further analysis in the EIS.</p>
Air Quality	<p>The Seashore, a Class I airshed, is located within the San Francisco Bay nonattainment areas for 8-hour ozone, 1-hour ozone, and fine particulate matter (less than 2.5 micrometers) (PM_{2.5}) as defined by the National Ambient Air Quality Standards set forth in the Clean Air Act (EPA 2011) and further specified by the Bay Area Air Quality Management District (BAAQMD 2010). The primary air pollutant sources associated with the San Francisco Bay Area are related to urban activities (i.e., commuting). Ongoing activities within the Seashore have a minimal contribution to air pollution in the nonattainment area.</p> <p>Volatile organic compounds (VOCs) are a general class of compounds containing hydrogen and carbon and are a precursor to the formation of the pollutant ozone. While concentrations of VOCs in the atmosphere are not generally measured, ground-level ozone is measured and used to assess potential health effects. When combustion temperatures are extremely high, as in automobile engines, atmospheric nitrogen gas may combine with oxygen gas to form various oxides of nitrogen. Of these, nitric oxide (NO) and nitrogen dioxide (NO₂) are the most significant air pollutants. This group of pollutants is generally referred to as nitrogen oxides or NO_x. Nitric oxide is relatively harmless to humans but quickly converts to NO₂. Nitrogen dioxide has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOCs, are also precursors to ozone formation. Emissions of VOCs and NO_x react in the presence of heat and sunlight to form ozone in the atmosphere. Accordingly, ozone is regulated as a regional pollutant and is not assessed on a project-specific basis.</p> <p>The “de minimis” emissions limits for general conformity with federal actions (i.e., “thresholds”) for nonattainment ozone and particulate matter are presented in chapter 1, table 1-1. Because ozone is a by-product of volatile organic compounds and nitrogen oxide, threshold levels for ozone are based on threshold levels of ozone precursors: VOCs and NO_x. The threshold levels for VOCs and NO_x are 54 pounds/day and 10 tons/year. Threshold levels for PM_{2.5} also are 54 pounds/day and 10 tons/year (BAAQMD 2010).</p> <p>DBOC’s direct and indirect emissions contribution to nonattainment was estimated for all activities (i.e., motorboats, maintenance equipment, employee vehicles, and trucks for transporting the shellfish). The results indicate that all DBOC emissions are equal to or below 3.5 tons per year for all nonattainment pollutants (chapter 1, table 1-1). The calculated levels for DBOC emissions related to NO_x are 2 to 4 pounds/day and 0.3 to 0.5 tons/year. The calculated levels for reactive organic gas (ROG) are 11 to 24 pounds/day and 1.6 to 3.5 tons/year. The calculated levels for both ozone precursors, ROG and NO_x, from DBOC operations fall well below threshold levels. The levels of PM_{2.5} discharge from DBOC boat emissions are considered to be negligible.</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>DBOC operations meet general conformity requirements because their regional emissions are well below the de minimis threshold levels established by federal and state general conformity requirements. If the no-action alternative is selected, emission levels would be well below levels calculated for DBOC operations, as all motorized activity in the water and onshore would cease with the exception of vehicles using the access road for the kayak launch and occasional administrative use of motorized boats, which would be subject to evaluation under minimum requirements and minimum tool determination processes as required by the Wilderness Act. Under the action alternatives, DBOC emissions, as estimated above, would continue at similar levels. Based on the calculated levels, the impact topic of air quality is dismissed from detailed analysis in this EIS.</p>
<p>Climate Change and Greenhouse Gas Emissions (Carbon Footprint)</p>	<p>Climate change refers to any significant change in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality, storm frequency, etc.) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences (NAS), and the United Nations Intergovernmental Panel on Climate Change (IPCC) provide clear evidence that climate change is occurring and will accelerate in the coming decades. There is strong evidence that global climate change is being driven by human activities worldwide, primarily the burning of fossil fuels and tropical deforestation. These activities release carbon dioxide and other heat-trapping gases, commonly called "greenhouse gases," into the atmosphere (IPCC 2007a, 2007b, 2007c, 2007d).</p> <p>There are two aspects of climate change that must be considered in an environmental impact analysis: (1) Human impact on climate change: i.e., through actions, the potential to increase or decrease emissions of greenhouse gases that contribute to climate change, and (2) The impact of climate change on humans: i.e., how the resources that are managed are likely to change in response to changing climate conditions, and how that changes or otherwise affects management actions and the impacts of those actions on the resource.</p> <p>Some of the activities associated with DBOC operations result in fossil fuel consumption (e.g., motorboats within Drakes Estero, trucks associated with the transportation of shellfish, and vehicles carrying visitors to the area). Equipment used to maintain DBOC facilities, access roads, and parking areas also consume fossil fuels. However, greenhouse gas emissions associated with any of the alternatives involving issuing a new SUP would likely be negligible.</p> <p>Additionally, some comments submitted during public scoping suggested that the quantity of greenhouse gas emissions (the carbon footprint) associated with oyster consumption would increase if a new SUP was not issued to DBOC (the no-action alternative) because of the loss of the local food source. Some comments suggested that without DBOC, the distance oysters would be transported to meet demand in the San Francisco Bay Area would greatly increase, thus increasing the overall greenhouse gas emissions. It is not clear how the shellfish market would respond should this local source cease operations. Local demand could be met in the future by various means. Oysters could be shipped in from outside the local area, which would increase the carbon footprint associated with transporting the product. Conversely, other local commercial shellfish operations may increase their production and distribution of oysters to the local market, which would result in a carbon footprint similar to existing conditions. Oyster production in California, as a whole, appears to be increasing at a rate greater than DBOC's production. For example, as described in chapter 3 of the EIS, in 2010, DBOC produced 585,277 pounds of shucked oyster meat (6.89 million oysters), a 28 percent increase over 2009 production levels. During this same period, the California oyster market increased 43 percent. An increase in Pacific oyster production in Humboldt Bay was the primary contributor to this change (the California Pacific oyster market increased 48 percent, by weight, between 2009 and 2010) (CDFG</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>2011e). Based on this information, it is likely that at least some portion of the current DBOC production could be accommodated by other operations in the state of California. Agencies are not required to engage in speculation or analyze indirect effects that are highly uncertain (CEQ 1981, Q18 [48 Fed. Reg. 18027]). Because there is no certainty regarding how the shellfish market and demand would respond to the proposed action, impacts from global carbon emissions cannot be meaningfully and/or quantifiably analyzed. While greenhouse gas emissions associated with the no-action alternative may potentially be greater due to increased transportation distances, they are also likely to be negligible in comparison to local, regional, and national greenhouse gas emissions.</p> <p>In addition, the effects of climate change on park resources over the 10-year planning horizon for this EIS are likely to be negligible. Issues associated with climate change's impact on the Seashore resources (rising sea temperatures, sea level rise, ocean acidification, etc.) are addressed in applicable sections of chapters 3 and 4 of the EIS. The contribution of the actions contemplated in this EIS on climate change is likely to be negligible and is dismissed from further analysis.</p>
Local Food	<p>DBOC grows and processes oysters and clams onsite and supplies these products to the surrounding communities. Approximately 40 percent of these products are sold to onsite customers, 40 percent is sold directly to local markets and restaurants, 18 percent is sold to Tomales Bay shellfish growers, and 2 percent is sold through a wholesale seafood distributor based in San Francisco (DBOC 2012bⁱⁱ). DBOC imports shellfish in the form of larvae (and seed) from California Department of Fish and Game (CDFG)-certified sources in compliance with a "Long-term Permit to Import Live Aquatic Animals into California" issued by CDFG. CDFG-certified hatcheries are located in Hawaii and along the U.S. west coast. DBOC's 2006 proof of use report shows that 1 million Manila clam seeds were acquired from Kona Coast Shellfish in Hawaii. For Pacific oyster larvae and seed, CDFG generally uses hatcheries on the west coast. For instance, for 2011, DBOC holds permits to import larvae/seed from Taylor Shellfish Farms in Washington (Permit MR-L-10-029) and Whiskey Creek Shellfish Hatchery in Oregon (Permit MR-L-10-028). However, DBOC has also used seed from Coast Seafoods Company in California and Kona Coast Shellfish in Hawaii.</p> <p>While many people in the Bay Area enjoy these natural foods, other proteins, such as beef, poultry, or finfish, also are produced in the vicinity of DBOC. In addition, other shellfish operations, such as the Tomales Bay Oyster Company and the Hog Island Oyster Company, both of which are in Tomales Bay proximal to DBOC (approximately 15-20 driving miles), contribute to the local oyster and clam supply. Similar to DBOC, these operations offer fresh shellfish for purchase onsite and to restaurants in the region. In addition to proteins, many other types of local foods are produced in Marin County and the Bay Area including dairy products, fruits, vegetables, and products derived from these food types. In 2011, aquaculture (oysters, mussels, and clams) accounted for 7 percent of the total agricultural production in Marin County. In comparison, livestock products such as milk and wool comprised 45 percent of the county total, while livestock (the animals themselves) and miscellaneous made up 28 percent (MCDA 2012). On average, DBOC has produced 513,152 pounds of seafood annually over the last 5 years, representing approximately 58 percent of the oysters in Marin County over this period (CDFG 2011e). As described further in the "Socioeconomic Resources" section of chapter 3, DBOC's contribution to the county shellfish market declined since 2007 to approximately 50 percent, therefore, it is estimated that of the aquaculture produced in Marin County in 2011, approximately 50 percent was produced by DBOC, equivalent to approximately 3.5 percent of the overall agricultural production of the county (CDFG 2011e; MCDA 2012). Based on this information, any change in DBOC's contribution to the local food supply would likely be negligible. For these reasons, the impact topic of local food has been dismissed from further analysis in the EIS.</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
Geological Resources	<p>NPS <i>Management Policies 2006</i> directs the NPS to preserve and protect geologic resources as integral components of park natural systems (NPS 2006d). Cultivation of shellfish within Drakes Estero and the processing facilities on the land are unlikely to affect geologic processes and resources, including soils and topography. Current sediment transport processes, which may be impacted by actions proposed in this EIS, are analyzed in the water quality section of this EIS. The impact topic of geologic resources is dismissed from further analysis in the EIS.</p>
Paleontological Resources	<p>Paleontological resources are defined as “resources such as fossilized plants, animals, or their traces, including both organic and mineralized remains in body or trace form” (NPS 2006d). NPS <i>Management Policies 2006</i> directs the NPS to preserve and protect paleontological resources in terms of the geologic data associated with the resource to provide information about the ancient environment (NPS 2006d). Paleontological resources have been identified within the Seashore, including concretions near the project area. These resources are outside the immediate project area and therefore would not be impacted by the proposed actions. Additionally, it is unlikely that activities associated with the proposed actions would disturb any undiscovered paleontological resources, as ground disturbance is not proposed outside the development area. The impact topic of paleontological resources is dismissed from further analysis in the EIS.</p>
Cultural Resources	<p>The NPS categorizes cultural resources as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections (NPS 2006d). The National Historic Preservation Act (NHPA) mandates preservation programs in every federal agency and identifies the NPS as the lead historic preservation agency. NHPA requires federal agencies to identify properties eligible for listing on the National Register of Historic Places (National Register) and recognizes five property types: districts, sites, buildings, structures, and objects. Cultural landscapes are usually classified as either districts or sites, depending upon their character. While parks may contain properties or activities that are old, the NPS Cultural Resources program manages properties found eligible for the National Register. Use of this site over time by customers and park visitors is not considered a historic or cultural resource. For a discussion of site use by visitors, see the “Visitor Experience and Recreation” section of the EIS.</p> <p>Under section 106 of the NHPA and implementing regulations 36 CFR 800, federal agencies must take into account the effects of their undertakings on significant historic properties and afford State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment as appropriate. The agency must seek ways to avoid, minimize or mitigate any adverse effects on historic properties. Concurrent with the NEPA process, a section 106 review is being conducted to determine whether the actions proposed in this EIS would result in an adverse impact on such resources. As part of this process, the California SHPO has been consulted regarding the eligibility of DBOC facilities for listing on the National Register. On April 1, 2011, the NPS notified the SHPO (and copied ACHP) of the intent to use this EIS process to meet section 106 consultation requirements. On October 18, 2012, the ACHP confirmed that they had reviewed the documentation provided and that their involvement in the section 106 review was no longer necessary (ACHP 2012, see appendix D of EIS). In a letter dated October 29, 2012, SHPO concurred with a finding of no adverse effects, although it was noted that unanticipated discovery or change in project description may require additional consultation under 36 CFR part 800 (SHPO 2012, see appendix D of EIS).</p> <p>During a meeting with The Federated Indians of Graton Rancheria representative on July 14, 2011, the NPS also notified the Tribe that it planned to use this EIS process to meet section 106 consultation requirements. This was followed up by letter on August 10, 2011 (NPS 2011g). The Tribe responded in a</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>letter dated August 29, 2011, noting their concurrence with the “request to use the EIS process to meet Section 106 ‘government to government’ consultation requirements” (FIGR 2011). Subsequently, on January 9, 2012, the NPS submitted a letter to The Federated Indians of Graton Rancheria to coordinate ongoing consultation and arrange a meeting to discuss the next steps for the proposed action, as related to section 106 consultation. Consultation with the Tribe was concluded on August 13, 2012, when The Federated Indians of Graton Rancheria submitted a letter of concurrence to NPS stating, “each of the four alternatives presented in the DEIS will have ‘no adverse effect’ on cultural resources under the standards set forth in 36 CFR 800.8(c)(1).” See appendix D of the EIS for copies of these letters.</p> <p>A Determination of Eligibility (DOE) was prepared for DBOC onshore and offshore facilities (Caywood and Hagen 2011). The DOE found that while the oyster-growing operation in Drakes Estero is significantly associated with the rebirth and development of the California oyster industry, which began in the 1930s, the property is ineligible for listing in the National Register because it lacks historic integrity. The period of historic significance for the site extends from 1957, when Charles W. Johnson assumed control of the Schooner Bay plant and the state oyster allotment, to about 1965, when his company successfully adapted Japanese off-bottom growing methods to the specific conditions of Drakes Estero. DOE project personnel conducted the documentation and assessment of the oyster farm in Drakes Estero as a potential cultural landscape.</p> <p>Of the seven aspects of integrity (location, setting, materials, workmanship, design, feeling and association), the property retains for the most part, integrity of location, setting, and association. The processing plant and the racks in the estero are in their original locations, and the property’s setting—the pastoral landscape surrounding the bay—has been little altered since the early 1930s (Caywood and Hagen 2011). With regard to integrity of materials, workmanship, and design, however, virtually all of the resources in the plant have been modified through structural additions and/or the application of modern materials. Some are in such poor condition that their structural integrity is threatened. Since the 1960s new materials and structures have been added, older structures removed or destroyed, and existing structures modified extensively. In addition, the design of the plant operation has been altered. Over the years processing systems and equipment have been removed, and the entire canning operation moved offsite due to health department concerns, then reestablished in a modern, hygienic shipping container. “Finally, the combination of alterations, including a general lack of material and design integrity, as well as the addition of modern structures, has altered the appearance of the Johnson Oyster Company operation, which in turn adversely affects the property’s integrity of feeling” (Caywood and Hagen 2011).</p> <p>Today, the plant bears little resemblance to the facility of the early 1960s. In a letter dated April 5, 2011, the NPS submitted the DOE to the SHPO requesting concurrence with the finding that the property is ineligible for listing on the National Register. The NPS received a response from the SHPO on August 4, 2011 (see appendix D) in which the SHPO concurred with the NPS determination that none of the facilities associated with DBOC’s operation are eligible for listing on the National Register (SHPO 2011).</p>
<i>Archeological Resources</i>	<p>Archeological resources are the remains of past human activity and records documenting the scientific or scholarly analysis of these remains. For over 2,000 years, humans have inhabited the Point Reyes Peninsula, employing its rich resources and modifying aspects of the landscape to meet their changing needs. Approximately 100 Coast Miwok archeological sites document a culture that was an integral part of the ecosystem (Sadin 2007). One known archeological site (CA-MRN-296) exists within the project area and is associated with the Coast Miwok whose descendents are members of The Federated Indians of Graton Rancheria, a federally recognized Tribe. The site is a contributing resource in a draft National Register of Historic Places district nomination for indigenous archeological sites within the</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>Seashore. Under all proposed action alternatives, the known archeological site would be excluded from the SUP boundary. As with other sites in the Seashore, there is potential for site disturbance as a result of unauthorized access. Regular site monitoring and management, which is afforded all archeological sites in the Seashore, would be conducted to reduce potential impacts on this site.</p> <p>Under all alternatives, if unknown archeological resources are discovered, the Seashore's standard protocol for inadvertent discoveries would apply. The Cultural Resources Management Division would be notified immediately and work in the immediate area would cease until the discovery is evaluated by a qualified archeologist. The discovery process defined by 36 CFR 800.13, the implementing regulations for NHPA (16 U.S.C. 470), would be applied. Evaluation of the discovery's significance would include consultation as appropriate with The Federated Indians of Graton Rancheria, SHPO, and the ACHP. In the event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered the process defined by 43 CFR 10.4-5, the implementing regulations of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), would be applied. NPS response to any discovery of human remains or sacred objects would include but not necessarily be limited to immediate notification of the Seashore's Superintendent and Cultural Resources Division, cessation of work in the immediate vicinity, protecting the objects of discovery, notifying and consulting with The Federated Indians of Graton Rancheria, and preparing a written plan of action.</p> <p>For the purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. For all ground disturbing activities within the onshore areas of DBOC, archeological identification studies, including construction monitoring by a qualified archeologist, may be required to determine the presence of unknown or buried archeological resources. The impact topic of archeological resources is dismissed from further analysis in the EIS.</p>
<i>Cultural Landscapes</i>	<p>According to NPS-28: <i>Cultural Resource Management Guideline</i> (NPS 2002b), a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions. The oyster-growing facilities lie within but do not contribute to the significance of the Point Reyes Ranches Historic District, which was determined eligible for the National Register (Historical Research Associates, Inc. 2008). As described above under "Cultural Resources," DBOC facilities were evaluated separately for listing on the National Register. While significantly associated with the California oyster industry from 1957-65, the property is ineligible for listing in the National Register because it lacks historic integrity. For the purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. The impact topic of cultural landscapes is considered but dismissed from further analysis in the EIS.</p>
<i>Historic Structures</i>	<p>A historic structure is defined by NPS-28 as "a constructed work, usually immovable by nature or design, consciously created to serve some human act" (NPS 2002b). As described above, a DOE was conducted to identify properties within the project area that are eligible for listing on the National Register. While the Seashore preserves over 300 historic structures, such as the Point Reyes Lighthouse, listed in the National Register, and the Point Reyes Lifeboat Station, a National Historic Landmark, none of the structures within the project area are eligible for listing on the National Register. For purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. The impact topic of historic structures is considered but dismissed from further analysis in the EIS.</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
<i>Ethnographic Resources and Sacred Sites</i>	An ethnographic resource is defined as any "site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (NPS 2002b). The Federated Indians of Graton Rancheria are culturally affiliated with the Seashore and have expressed concern that their cultural legacy may be impacted if a new SUP is issued to DBOC (FIGR 2007). However, no traditional cultural properties have been identified within the project area. One Coast Miwok archeological site has been identified within the project area; however, the project would not affect this site, as described above under "Archeological Resources." The impact topic of ethnographic resources and sacred sites is considered but dismissed from further analysis in the EIS.
<i>Indian Trust Resources</i>	The federal Indian Trust is a legally enforceable obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it creates a duty to carry out the mandates of federal laws with respect to Native American Tribes. Of the federally recognized Tribes pursuant to PL 103-454, 108 Stat. 4791, The Federated Indians of Graton Rancheria/Coast Miwok is the only Tribe affiliated with the Seashore. However, there are no known Indian Trust resources in the study area, and the lands composing the Seashore are not held in trust by the Secretary for the benefit of Indians. The impact topic of Indian Trust resources is considered but dismissed from further analysis in the EIS.
<i>Museum Collections</i>	A museum collection is an assemblage of objects, works of art, historic documents, and/or natural history specimens collected according to a rational scheme and maintained so that they can be preserved, studied, and interpreted for public benefit (NPS 2002b). The project area does not include any museum collection or objects. The impact topic of museum collections is considered but dismissed from further analysis in the EIS.
Environmental Justice	<p>Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-income Populations," requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental impacts of their programs and policies on minorities and low-income populations and communities (EPA 1994). The guidance provides six principles for consideration of environmental justice, which are: 1) composition of affected area and whether there are low-income populations, minority populations, or Indian tribes, 2) public health and industry data for assessment of environmental hazards, 3) recognition of interrelated cultural, social, occupational, historical, or economic factors that could amplify environmental effects, 4) encouragement of public participation and accommodations to overcome linguistic, cultural, institutional, geographic, and other barriers, 5) meaningful community representation with awareness of diverse constituencies, and 6) soliciting tribal representation. Applicable principles are discussed in the following paragraphs.</p> <p>The NPS notes that many of the 31 employees at DBOC individually qualify as low-income and/or minority. However, under the thresholds established by the Executive Order, the employees themselves do not constitute a low-income or minority population, other than as part of the community in which DBOC is located. Adverse impacts to DBOC employees related to the proposed alternatives are limited to socioeconomic impacts. While not appropriate as a topic for environmental justice, economic impacts of the proposed action at the Inverness CDP, Marin County, and State of California level are retained for analysis in this EIS under socioeconomic resources. Existing socioeconomic conditions and the potential impacts associated with the proposed alternatives are described in the affected environment and environmental consequences chapters (chapters 3 and 4) of the EIS.</p> <p>CEQ's "Environmental Justice Guidance Under the National Environmental Policy Act" provides guidance to federal agencies on how to determine the presence of low-income and minority populations within an appropriate unit of geographic analysis. The guidance defines the identification of a minority population</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>where either "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997).</p> <p>For the purposes of this EIS, the affected area (area of analysis) for environmental justice is Inverness Census Designated Place (CDP). This is consistent with the scale used to describe the socioeconomic impacts of the project on a local level. Marin County is used for comparative purposes, as it is the next-largest scale used to describe socioeconomic impacts. According to 2010 census data, the total population of Inverness is 1,304. As shown in table 3-7 in chapter 3 of the EIS, the minority population of Inverness CDP make up 7.1 percent and of the total population. Six percent of the CDP's population is of Hispanic descent.</p> <p>In comparison, the minority population of Marin County, which is used herein as the general population, is 20 percent, with a total population of 252,409. Marin County residents of Hispanic descent make up 15.5 percent of the county's population. It should be noted that the concept of race is different than the concept of Hispanic origin. Therefore, the U.S. Census collects separate data on Hispanic and minority populations. Specifically, Hispanic is not considered a minority population by the U.S. Census and must be considered independently from race. For example, nearly half of the Marin County residents who reported to be Hispanic in 2010 indicated that their race was "white only." The remaining 54 percent of the Hispanics within the county specified another race, stated they were of "some other race", or indicated they were of two or more races (U.S. Census Bureau 2010). Those Hispanics that reported to be "white only" are not considered minority. Similarly, 51 percent of the Hispanic population in Inverness CDP reported to be "white only" (U.S. Census Bureau 2010). As such, it is not appropriate to add the Hispanic and minority percentages together to achieve an overall minority percentage. This would result in double counting and an inflation of the actual minority population in Inverness CDP and Marin County. In accordance with CEQ regulations and thresholds, Inverness CDP does not meet the criteria of an environmental justice population based on its minority population, as the minority population is well below both the CEQ threshold of 50 percent and is not meaningfully greater than the minority population percentage in the general population.</p> <p>A similar analysis was used to determine whether the affected area constitutes a low-income environmental justice population. CEQ's "Environmental Justice Guidance Under the National Environmental Policy Act" specifies, "Because CEQ guidance does not provide a specific threshold to identify low-income populations, U.S Census 2010 data was compared to thresholds defined by the Metropolitan Transportation Commission (MTC) during development of their Transportation Improvement Program for the San Francisco Bay Area. The MTC established a low-income threshold of 30 percent, whereby any community whose population consists of more than 30 percent low-income residents would be considered a "community of concern" (MTC 2010). According to 2010 census data, the low-income population of Inverness CDP make up 12.8 percent and of the CDP's total population. In comparison, the low-income population of Marin County is 7.0 percent. As such, in accordance with CEQ regulations and thresholds, Inverness CDP does not meet the criteria of an environmental justice population based on its low-income population, as the population meeting the criteria for low-income is well below the regional threshold of 30 percent.</p> <p>As stated by DBOC, 22 employees are Hispanic or Latino and most also fall into the category of low-income (DBOC 2011ⁱⁱⁱ). However, under the applicable thresholds and as described above, the employees themselves do not constitute a low-income or minority population.</p>

TABLE ES-2. ISSUES AND IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS (CONTINUED)

Issue/Impact Topic	Rationale for Dismissal
	<p>The second factor identified in the Executive Order does not apply here because the public health impacts from this project are remote and negligible. For example, NPS considered air quality as an impact topic in the EIS but dismissed it from further consideration when it determined that emissions from the alternatives would be below the “de minimis” thresholds for San Francisco Bay Area nonattainment areas (see the “Air Quality” section above).</p> <p>Pursuant to the third factor, NPS recognizes that there are some cultural, social, occupational, historical, or economic factors that may amplify environmental impacts of the project, such as current economic conditions. However, because the impacts to minority and low-income populations would be limited to DBOC employees and not surrounding minority populations, this is not a relevant factor for environmental justice consideration. However, where applicable, these factors are considered as part of the cumulative impact analysis for Socioeconomic Resources in chapter 4 of the EIS.</p> <p>In accordance with the fourth factor, NPS encouraged public participation throughout the NEPA process. The public scoping period was open between October 8, 2010 and November 26, 2010. The Draft EIS was made available for public review and comment beginning on September 23, 2011 and ending December 9, 2011. Both of these comment periods were extended beyond the standard 30 and 60 days, respectively, to accommodate any interested parties who may have been adversely affected by a power outage in 2010 that disrupted the NPS PEPC system, and in 2011 to consider additional comments in light of the Marine Mammal Commission’s November 2011 report (MMC 2011b). Comments were accepted online, in park forms available at the public meetings, as well as by mail. NPS also held three public scoping meetings in 2010 and three public meetings in 2011 during the public review of the Draft EIS. NPS included Spanish-language interpreters at all public meetings to accommodate parties of limited-English, and the fact sheet available at the 2011 public meetings was also available in Spanish.</p> <p>As noted previously, because potentially disproportionate impacts to minority and low-income populations would be limited to DBOC employees, the fifth environmental justice factor identified in Executive Order 12898 is not relevant to the proposed action. However, as explained under the fourth factor, NPS provided public participation opportunities that were available to interested parties who individually qualify as low-income or minority.</p> <p>Sixth, NPS consulted with The Federated Indians of Graton Rancheria inviting the tribe to provide information on features of cultural or religious significance. The correspondence is provided in appendix D of the Final EIS.</p> <p>Based on the information provided above, the impact topic of environmental justice is considered but dismissed from further analysis in the EIS. As noted previously, impacts of the proposed action on DBOC employees is evaluated in the socioeconomic resources sections of this EIS.</p>

ALTERNATIVES

The alternatives selected for detailed analysis are summarized below and in table ES-3. Consistent with NEPA and the stated purpose and need, this EIS explores a reasonable range of alternatives, including a no-action alternative (see, 40 CFR 1502.14). The analysis of impacts is presented in “Chapter 4: Environmental Consequences.”

This EIS presents one no-action alternative, under which DBOC’s operations would end after the existing authorizations for DBOC expires on November 30, 2012, and three action alternatives, under which the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC to operate in Drakes Estero for a period of 10 years through November 30, 2022. The alternatives presented in this EIS were developed taking into consideration the results of internal discussions, review of public comments, and consultation with local, state, and other federal agencies. Development of the action alternatives also was informed by the scope and scale of the existing DBOC operations and facilities, as authorized by the existing RUO and 2008 SUP. During the process of developing this EIS, DBOC comments, responses, and submittals to other agencies were reviewed. In addition, DBOC conducted a site tour with the NPS and consultants. The alternatives development process also included a review of previous documents regarding operations and development within the project area, reference materials, and the recommendations of the NAS report *Shellfish Mariculture in Drakes Estero* (2009). Additional reviews conducted specifically regarding this document have also been taken into account. Additional detail on use of these publications is included in the “Independent Reviews of the Science Used in this EIS” section of chapter 1.

ELEMENTS COMMON TO ALL ALTERNATIVES

There are a number of elements common to all alternatives, as listed below. They are as follows:

- The current NPS authorizations, which consist of the RUO and the 2008 SUP, expire on November 30, 2012.
- Subsequent to expiration of the SUP, the congressionally designated potential wilderness would be converted to congressionally designated wilderness, although the year in which this takes place would vary between the no-action (2012) and action alternatives (2022).
- NPS would continue to maintain the existing NPS facilities within the project area: the access road, a gravel parking lot, vault toilet, and an interpretive board.
- When NPS’s authorizations to DBOC expire (either 2012 or 2022), DBOC would remain responsible for the removal of those buildings and structures owned by DBOC as listed in table 2-3 (i.e., the temporary office trailer, the punching shed, the temporary cannery, temporary storage, setting tanks, the three mobile homes, and the picnic facilities) and all personal property (including any improvements made to the area since 1972). The year in which these removal and restoration activities would take place would vary between the no-action (2012) and action alternatives (2022).
 - DBOC would be responsible for removing all shellfish and shellfish infrastructure including racks from within Drakes Estero as part of the closeout of the permit. There are a number of approaches to remove the racks, ranging from import of a small barge with hydraulic lift to pull the posts to deconstruction using existing barge and boats. While most of the removal

activities would be manual, mechanized boats would be required for the duration of the removal activities. It is estimated that approximately 4,700 posts (2-inch by 6-inch boards) and more than 179,000 linear feet of pressure-treated lumber will be removed and disposed of properly. Standard best management practices (BMPs) for sediment control and habitat protection, such as the use of silt curtains, would be employed during removal of the rack structures. Divers would also remove by hand any large debris that had fallen beneath the racks such as large chunks of shell or other remains of oyster strings. It is likely that the removal may take 2 to 3 months. The timing of the rack removal would occur outside of the harbor seal closure period (March 1-June 30).

- Removal of the bag infrastructure would likely occur in conjunction with harvest of the shellfish from Drakes Estero upon closeout. If conducted separately, it is estimated recovery of all anchor materials and lines could take up to 2 to 4 weeks and would require the use of boats and barges for hauling.
- DBOC would also be required to restore the affected areas to good order and condition by the end of the permit term, as specified by section 23(a) of the SUP.
- For any ground disturbing activities conducted within the onshore permit area, archeological identification studies, including construction monitoring by a qualified archeologist, would be required to determine the presence of unknown or buried archeological resources. In the event that unknown archeological resources are discovered during construction, the park's Cultural Resources Division would be notified immediately and work in the immediate area would cease until the discovery is evaluated by a qualified archeologist. The discovery process defined by 36 CFR 800.13, the implementing regulations for NHPA (16 U.S.C. 470), would be applied.
- Common to all alternatives, baseline surveys and monitoring of resources would occur to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (e.g., tunicates, Manila clams, Olympia oyster, etc.), and eelgrass. These surveys and results of monitoring would provide site-specific data and further increase understanding of the natural ecological processes within Drakes Estero, thus improving the long-term management of Drakes Estero. Some of the baseline surveys and monitoring listed below would be accomplished through the hiring of two seasonal employees, as described in the NPS operations section.

1. Benthic and infaunal communities

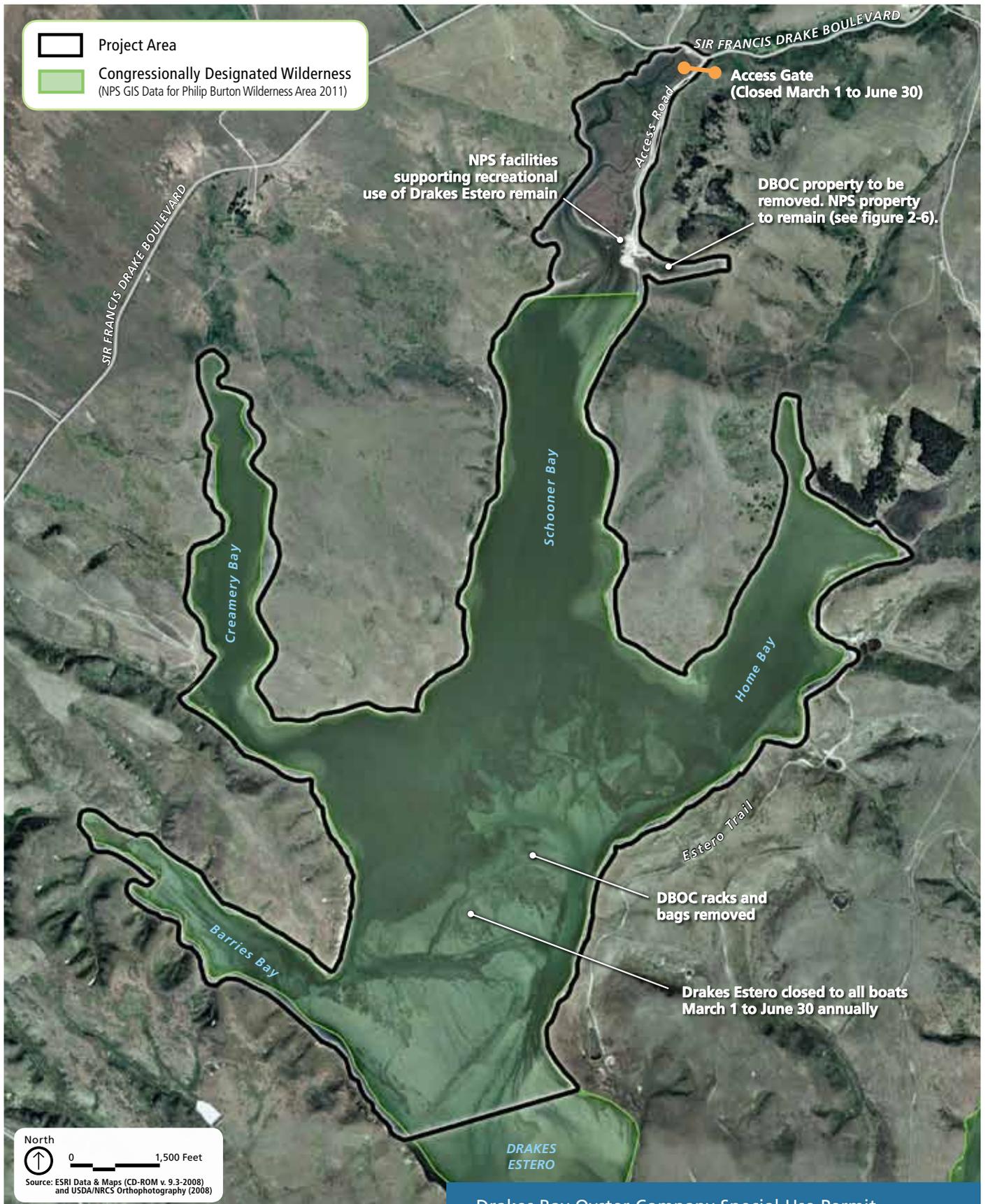
- a. Map and quantify the extent of non-native within Drakes Estero, specifically:
 - i. Establish a species list
 - ii. Identify non-native species of management priority
 - iii. Identify extent of Manila clam establishment within Drakes Estero
 - iv. *Didemnum vexillum*
 1. Assess overall distribution within Drakes Estero
 2. Evaluate distribution and annual cycle of *Didemnum* on hard structure and soft substrate
 3. Evaluate literature sources for effectiveness of *Didemnum* removal techniques
 4. Survey eelgrass for tunicates to determine if there may be any effects of tunicate "source" on eelgrass tunicate loads.
 5. Survey *Didemnum* density consistent with distance from rack locations.

- b. Map and quantify the extent of native species within Drakes Estero, including:
 - i. Distribution of Olympia oyster in Drakes Estero
2. Eelgrass
 - a. Assess eelgrass dynamics within Drakes Estero based on review of historic aerial images
 - b. Document and evaluate recovery of eelgrass scars from propellers
 - i. Identify rate of regrowth in relation to depth and extent of scarring
 - ii. Identify species of eelgrass present in the regrowth area
3. Quantitative comparisons of Drakes Estero and Estero de Limantour
 - a. Water residence time
 - b. Presence/absence of non-native species

ALTERNATIVE A: NO NEW SPECIAL USE PERMIT—CONVERSION TO WILDERNESS (NO-ACTION)

Alternative A considers the expiration of the existing RUO and SUP and subsequent conversion to wilderness, consistent with PL 94-567. The existing SUP and RUO expire on November 30, 2012. Under Alternative A, the Secretary would not exercise the discretion granted to him under section 124 to issue a new 10-year SUP. Upon cessation of the nonconforming uses in Drakes Estero, the NPS would convert the area to wilderness. Specifically, under alternative A:

- At expiration of the SUP, DBOC would be required to remove certain buildings and structures, and all of its personal property and undertake steps to restore the area to good order and condition.
- All closeout procedures, including removal of structures, personal property, items related to shellfish cultivation and processing, including all racks and bags distributed within Drakes Estero, would be completed consistent with the terms of the existing RUO and SUP.



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National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

FIGURE ES-5
Alternative A: No New Special Use Permit – Conversion to Wilderness (No-action) (Offshore Conditions)



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

There are a number of elements that would be common to all action alternatives. They are summarized here and restated under each alternative.

- A new SUP authorized under section 124 of PL 111-88 would be issued to DBOC for a period of 10 years. Because these alternatives include the authorization for DBOC to continue operating for 10 years, the NPS would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness for 10 years. The new SUP would expire on November 30, 2022. No extensions or renewals would be issued because section 124 only authorizes one 10-year permit. The new SUP would be based on the existing SUP, would incorporate requirements as identified in this EIS, and would incorporate the area of the RUO into the SUP. In keeping with section 124's direction that the new authorizing instrument would be a SUP, a new RUO would not be issued.
- DBOC would continue to process and pack shellfish in the onshore permit area. However, the scale of DBOC onshore operations would vary by alternative, and the configuration and condition of other onshore facilities would vary by alternative.
- DBOC's ability to obtain and operate under a new SUP would also be contingent on DBOC's compliance with all applicable laws. Prior to implementation of any development activities, DBOC shall obtain all necessary permits and approvals, as described in chapter 2.
- Under all action alternatives, as a condition of permit issuance, DBOC would be required to relinquish its state water bottom lease. Relevant provisions of the existing CDFG leases would be incorporated into the SUP including repair and cleanup requirements, payment requirements, the maintenance of an escrow account as "a financial guarantee of growing structure removal and/or cleanup expense in the event the lease is abandoned or otherwise terminated", and rights of inspection (including premises, equipment and books pertaining to cultivation). This would ensure that certain provisions relating to DBOC operations that are currently incorporated into the SUP by reference remain in force. CDFG would retain authority under Fish and Game Code to regulate the stocking of aquatic organisms, brood stock acquisition, disease control, importation of aquatic organisms into the state, and the transfer of organisms between water bodies.
- NPS would exercise oversight of DBOC operations in accordance with the terms of the new permit. Section 2(b) of the 2008 SUP, establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the Premises.
- DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124. If the state water bottom lease continued after November 30, 2012, DBOC would be required to make lease payments to the state in addition to making fair market value payments to the United States.
- NPS would exercise oversight of DBOC operations in accordance with the terms of the new permit. Section 2(b) of the 2008 SUP, establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the Premises.
- The 2008 SUP includes a number of conditions that address aquaculture operations in Drakes Estero. Pursuant to Section 124, which provides the Secretary the discretionary authority to issue a

special use permit with the same terms and conditions as the existing authorizations, the following conditions from the 2008 SUP are included as elements common to all action alternatives:

- A cap on production levels (Section 4b[i])
- No construction of additional aquaculture racks and/or cultivation infrastructure without prior approval of the NPS (Section 4b[ii])
- Avoidance of eelgrass when placing bags (Section 4b[iii])
- Submission of a boating operations plan including dedicated navigation routes chosen to minimize impacts to eelgrass beds (Section 4b[iv])
- Importation of shellfish in the form of larvae and seed certified by CDFG (Section 4b[v])
- Species of shellfish beyond those described in the existing leases may not be introduced without prior written approval of the NPS (Section 4b[vi])
- Avoid disturbance to marine mammals and marine mammal haul-out sites, including maintaining a distance of at least 100 yards from hauled out seals and conformance with the “Drakes Estero Aquaculture and Harbor Seal Protection Protocol” (Section 4b[vii])
- Follow seasonal permanent closure areas (Exhibit B)
- All lumber utilized at the site will be processed in compliance with current laws and regulations regarding wood treatments. This includes lumber utilized in assembly and repair of aquaculture racks (Section 6[i])
- Permittee will make best efforts to remove debris associated with aquaculture production operations including wood from racks, plastic spacers, unused shellfish bags, shellfish shells, and any other associated items (Section 7[b])
- Per Section 4(b)⁴, specific measures incorporated into the EIS based on public, agency, and NAS comments during the NEPA process include the following:
 - Clearly delineate boat access routes for use under action alternatives
 - Delineate seasonal and permanent closure areas with GPS and visual demarcation
 - Devise and implement methods for tracking all oyster-related watercraft in the estuary using GPS technology (MMC 2011b)
 - Mark aquaculture boats for easy identification (MMC 2011b)
 - Removal of European flat oyster as a potential species for cultivation (DBOC 2012b^{iv})
 - Prohibition of stake culture methods
- As with the existing authorizations, prior to expiration on November 30, 2022, the new SUP would require DBOC to remove certain buildings and facilities, any structures or improvements added to the property since 1972, and all its personal property (including shellfish and shellfish rack infrastructure) from the onshore and offshore operating areas. This includes the temporary office trailer, punching shed, temporary cannery, temporary storage, setting tanks, main dock, work platform, sediment basin, mobile homes, picnic areas, shell storage, and all other equipment.
- Any new structures developed under the authority of the new permit would be considered personal property and would be removed prior to the expiration of the permit.
- DBOC would be required to restore affected areas to “good order and condition” by the end of the permit term, as specified by section 23(a) of the SUP. NPS would oversee this work and work

⁴ Per section 4(b) of the 2008 Special Use Permit, “Based upon the findings of an independent science review and/or NEPA compliance, Permittee reserves its right to modify the provisions of this Article 4. Permittee further reserves its right to incorporate new mitigation provisions based upon the findings of an independent science review.”

with DBOC to establish an orderly timetable for removal and to ensure that it is completed prior to the expiration of the new SUP.

- NPS would adjust the boundaries of the permit area would be adjusted to incorporate all areas within Drakes Estero required for shellfish operations. Boundary adjustments would be made to encompass reasonable boat travel routes between culture beds and include the six racks currently located outside the permit boundaries. Boat operations would not be allowed outside of permit boundaries unless specifically authorized under the SUP.
- All ground disturbing activities would require NPS approval due to the potential for archeological resources in the area.
- NPS would exclude the harbor seal protection areas and a known archeological site from the new permit boundary. Modification of the permit area to exclude established seal protection areas from the permit boundary reduces the offshore boundary by approximately 4 acres. Removal of the onshore archeological site from the permit area reduces the permit area by approximately 0.3 acres.
- NPS would establish a production limit, consistent with SUP section 4(b)(i). The production limit would be defined as the average annual production over a rolling three year period, which would include the current year and the two previous years. An example of this rolling average is given under alternative B below. The use of this rolling average is a reasonable accommodation that allows the operator to plan and adjust production based upon results of prior year production and is within the reasonable timeline of production. The production limits proposed would be inclusive of all shellfish species harvested.
 - These production limits are based on the use of the conversion methods used by CDFG during the drafting of this document. Specifically, the weight of Pacific oysters is calculated assuming 100 oysters per gallon (per California Fish and Game Code Section 15406.7) for shucked product and 8.5 pounds per gallon. Manila clams are calculated as 30 clams per pound.
- DBOC would use and maintain structures in both offshore and onshore areas to support its operations, with variations among the alternatives. Likewise, equipment currently deployed for these activities would also be in use for all action alternatives.
- DBOC would cultivate approximately 138 acres of Drakes Estero using a combination of rack culture, floating culture, and bottom bag culture methods. Within the 138 acres of culture beds, DBOC would conduct hanging culture using the 95 existing racks in Drakes Estero and would conduct bag culture in up to 84 acres of Drakes Estero (although, as mentioned above, some of this 84 acres may be left fallow between uses).
 - Any proposal for new racks and/or changes in cultivation area would require additional review and compliance under the SUP.
- DBOC would repair/replace 50 racks in 2013 and another 25 racks in 2014. Based on assumptions described in chapter 2, the 2013 repairs would require installation of between 65,000 and 97,000 linear feet of lumber, and 1,700 and 2,500 vertical 2-inch by 6-inch posts would be installed into the estero bottom. The 2014 repairs would result in the installation of between 14,000 and 29,000 linear feet of lumber and 380 to 750 vertical posts. Following the initial wide-scale repairs, regular maintenance would take place. NPS estimates that repair and replacement would be minimal with approximately 1,000 to 2,000 linear feet of lumber installed annually with a limited number of vertical posts replaced as necessary.
- NPS and CDPH have reviewed sampling protocols, intent, and requirements. The current SUP includes language for access to the main channel. Access to that station shall be made at flat wake

speed within 1 hour of predicted high tide for the area. Flat wake speed means the minimum required speed to leave a flat wave disturbance close astern a moving vessel yet maintain steerageway, but in no case in excess of 5 statute miles per hour (36 CFR 1.4). With regard to water quality monitoring stations for pathogens, CDPH generally requires that primary sites within the permitted growing areas are sampled once per month, with greater frequency during the winter season.

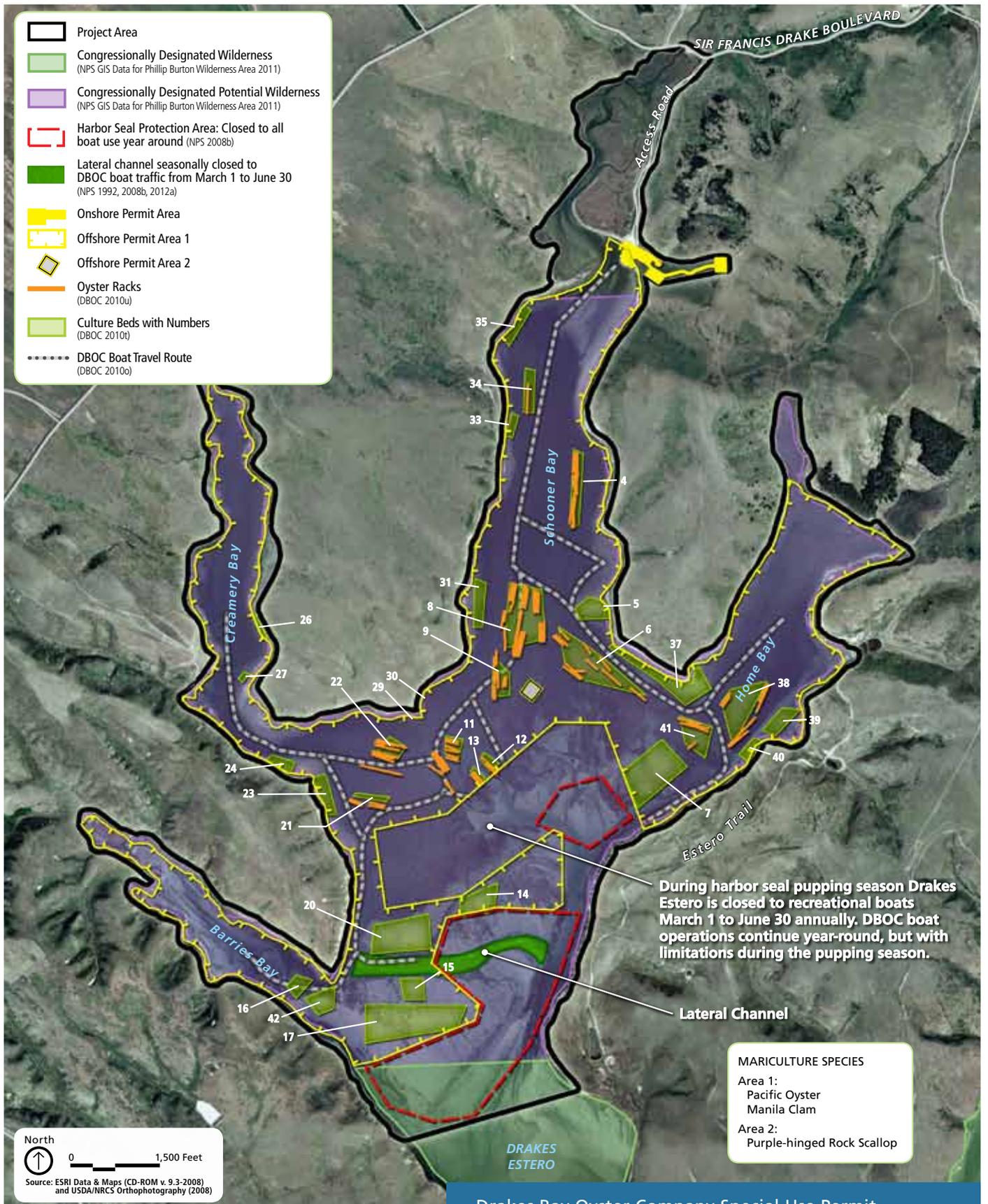
- DBOC operations would be subject to the harbor seal protection protocol, which is part of the current SUP. This protocol prohibits boat travel and general operations, including placement of bags, moorings, and installation of floating racks, within the established harbor seal protection areas (see figure ES-2). Other restrictions contained in the existing protocol, including closure of the lateral channel (also shown on figure ES-2) during the harbor seal pupping season (March 1–June 30) and maintenance of a 100-yard buffer from any hauled-out harbor seal, would continue to be in effect.
- A one-time dredging event at the main dock is common to all action alternatives. The area under the main dock would be dredged by DBOC. Dredging would take place at the outset of the permit term in an area approximately 30 feet wide by 60 feet long and to a depth of approximately 3 feet.
- DBOC would replace the existing dock, work platform, and associated structures subject to NPS final review and approval due to the damage from the March 2011 storm. Rather than replacing these items in kind, DBOC has proposed to construct or install the following:
 - A new wooden floating dock (12 feet by 32 feet)
 - A new concrete work platform (approximately 55 feet by 24 feet)
 - New wooden ramps to connect the dock and work platform
 - A new conveyor
 - A washing system

ALTERNATIVE B: ISSUE NEW SPECIAL USE PERMIT—EXISTING ONSHORE FACILITIES AND INFRASTRUCTURE AND OFFSHORE OPERATIONS WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Alternative B considers a level of use consistent with conditions that were present in fall 2010 when the NPS initiated evaluation under the EIS. The existing SUP and RUO expire on November 30, 2012. The Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative B:

- Onshore facilities and infrastructure, including previously unpermitted infrastructure, would remain until November 30, 2022. This would be generally consistent with what is currently present on the site.
- The total acreage of the SUP area, both onshore and offshore, would be approximately 1,083 acres.
- With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
- Mariculture activities, including boat operations, would only take place within the established SUP area.

- Shellfish production would not exceed 600,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This level of production is consistent with the 2010 DBOC harvest.
- Pacific oysters and Manila clams could be cultivated on documented shellfish growing areas within the main permit area, Area 1 (currently known as Lease M-438-01) using rack culture, floating culture or bottom bag culture methods. Purple-hinged rock scallops could only be grown in the existing 1-acre plot, Permit Area 2 (currently known as Lease M-438-02) using floating racks, floating trays, and lantern nets or similar techniques.
- DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.
- NPS would evaluate future requests regarding operational and infrastructure changes from DBOC for consistency with the intent of this alternative, which is to maintain existing conditions and levels of production.
- By November 30, 2022, DBOC would be required to remove certain buildings and structures and all of its personal property and to undertake steps to restore the area to good order and condition.



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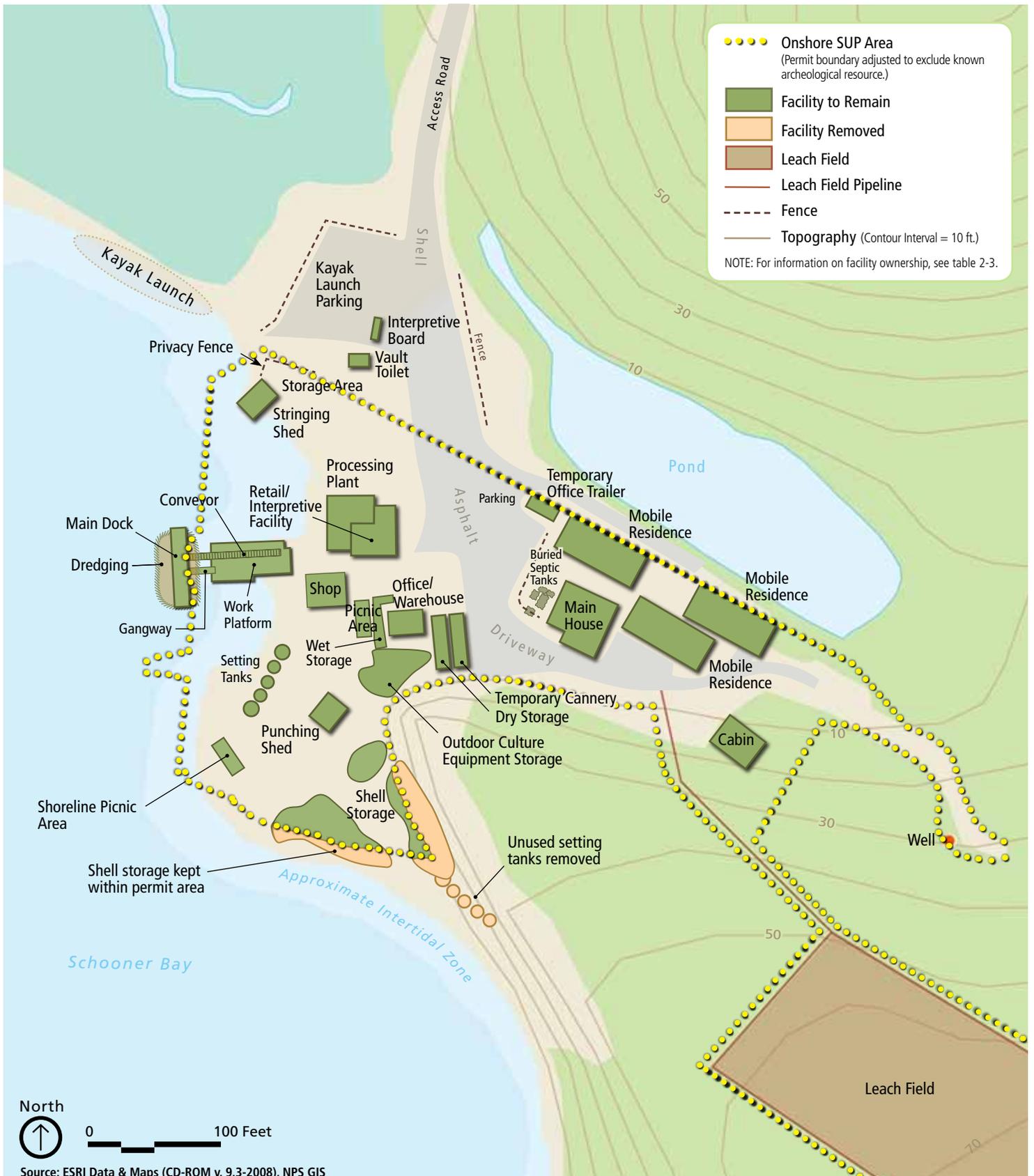
FIGURE ES-7

Alternative B: Issue New Special Use Permit – Existing Onshore Facilities and Infrastructure and Offshore Operations Would be Allowed for a Period of 10 Years (Offshore Operations)



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FIGURE ES-8
Alternative B: Issue New Special Use Permit – Existing Onshore Facilities and Infrastructure and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations)

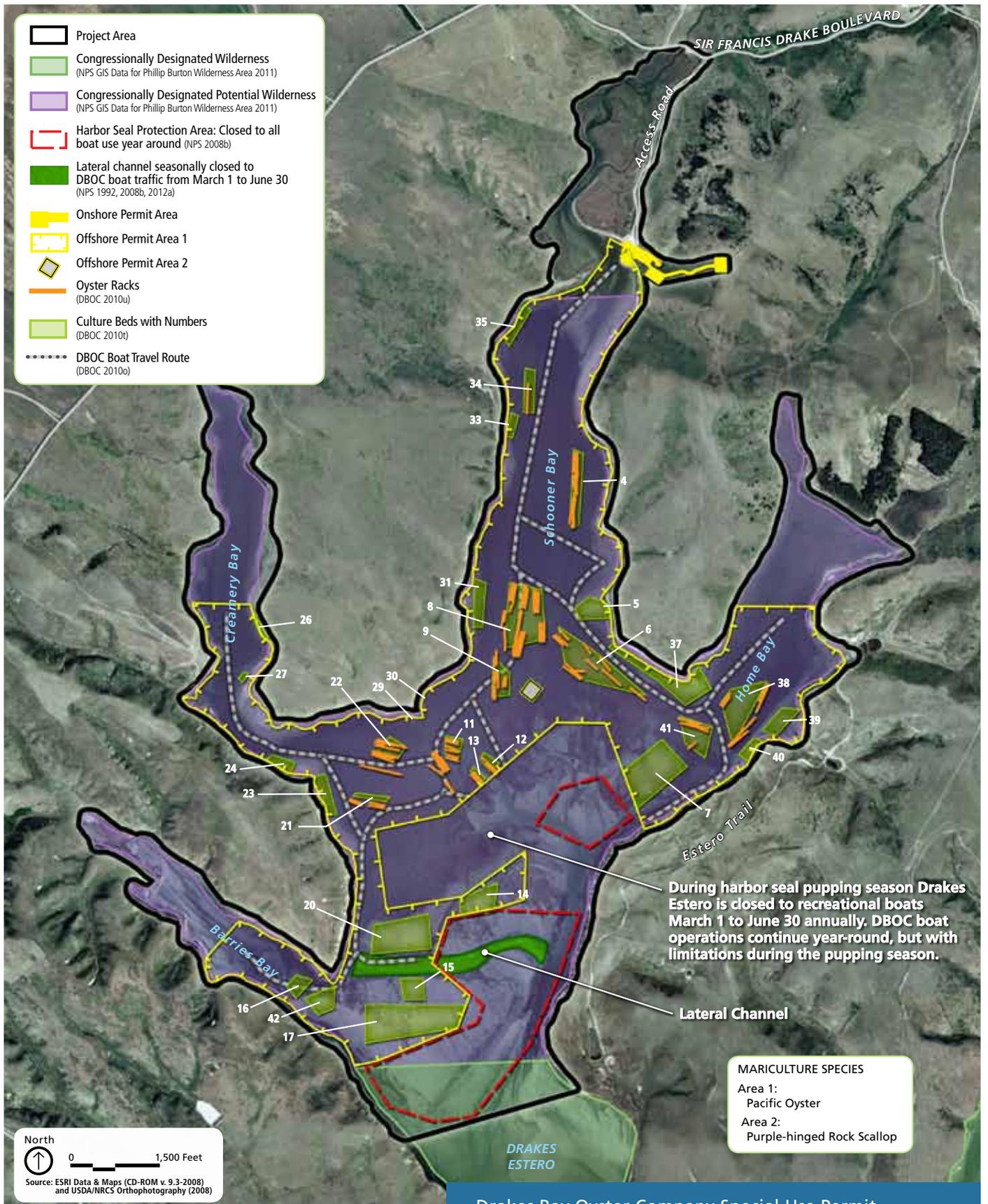


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ALTERNATIVE C: ISSUE NEW SPECIAL USE PERMIT—ONSHORE FACILITIES AND INFRASTRUCTURE AND MOST OFFSHORE OPERATIONS PRESENT IN 2008 WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Alternative C considers a level of use that was occurring at the time the current SUP was signed in April 2008. The existing SUP and RUO expire on November 30, 2012. Under Alternative C, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative C:

- In contrast to alternative B, onshore infrastructure would be slightly reduced by removing unpermitted and nonessential facilities. Infrastructure would remain until November 30, 2022.
- The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 901 acres. Those acres not included in the permit area under this alternative are not currently available for production due to state water quality harvest prohibitions.
- Mariculture activities, including boat operations, would only take place within the established SUP area.
- With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
- Shellfish production would not exceed 500,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This represents an approximately 10 percent increase above the average annual DBOC production for the period 2007 to 2009, which was approximately 450,000 pounds per year.
- Pacific oysters could be grown on documented shellfish growing areas within the main offshore permit area, Area 1 (currently known as Lease M-438-01) using rack culture, floating culture, or bottom bag culture methods. Purple-hinged rock scallops could only be cultivated in the existing 1-acre plot, Area 2 (currently known as Lease M-438-02) using floating racks, floating trays, and lantern nets or similar techniques.
- DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.
- NPS would evaluate future requests for operational and infrastructure changes from DBOC taking into consideration consistency of the proposed changes with 2008 conditions and levels of production.
- By November 30, 2022, DBOC would be required to remove certain buildings and structures, and all of its personal property, and undertake steps to restore the area to good order and condition.



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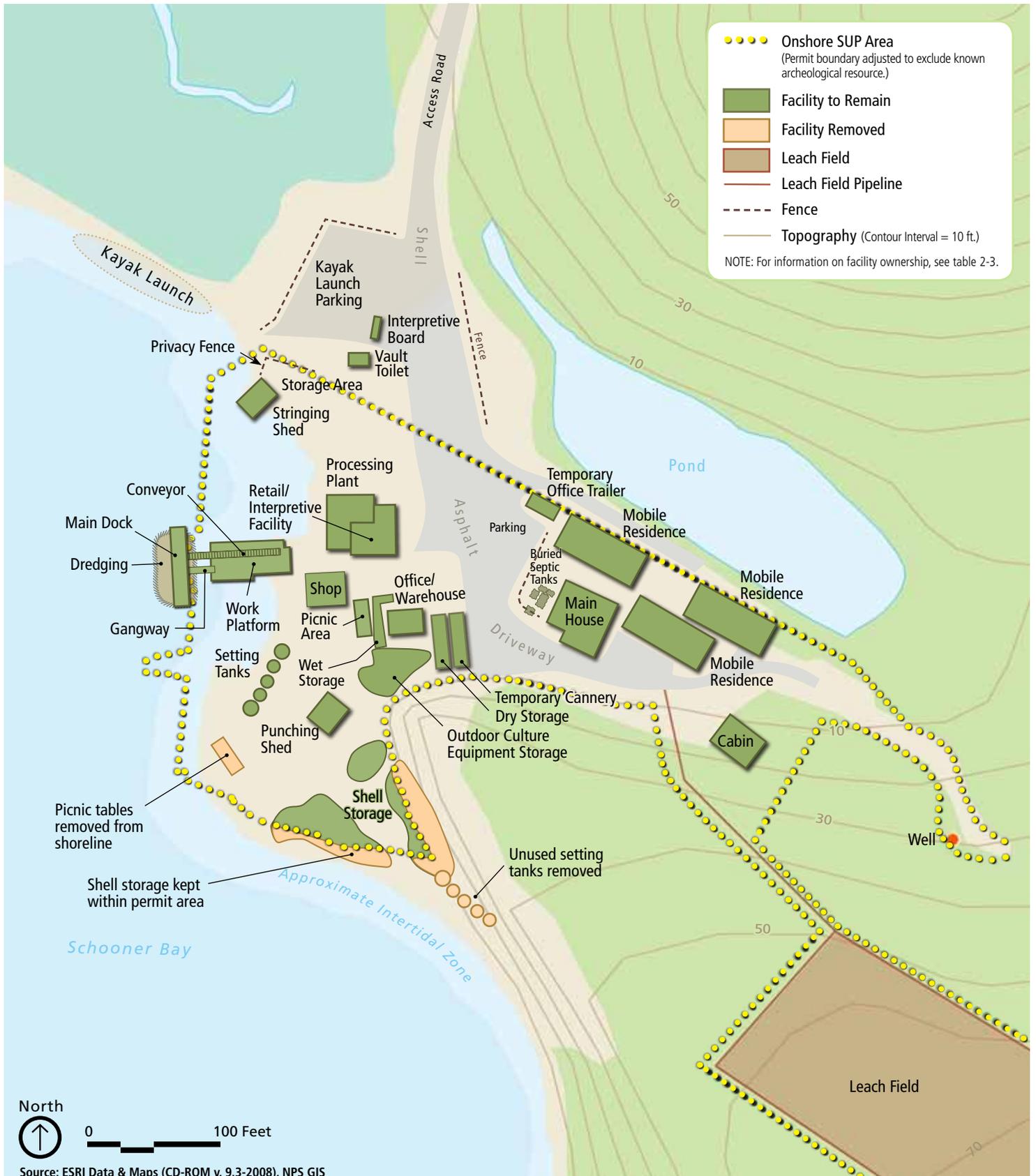
FIGURE ES-9

Alternative C: Issue New Special Use Permit – Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would be Allowed for a Period of 10 Years (Offshore Operations)



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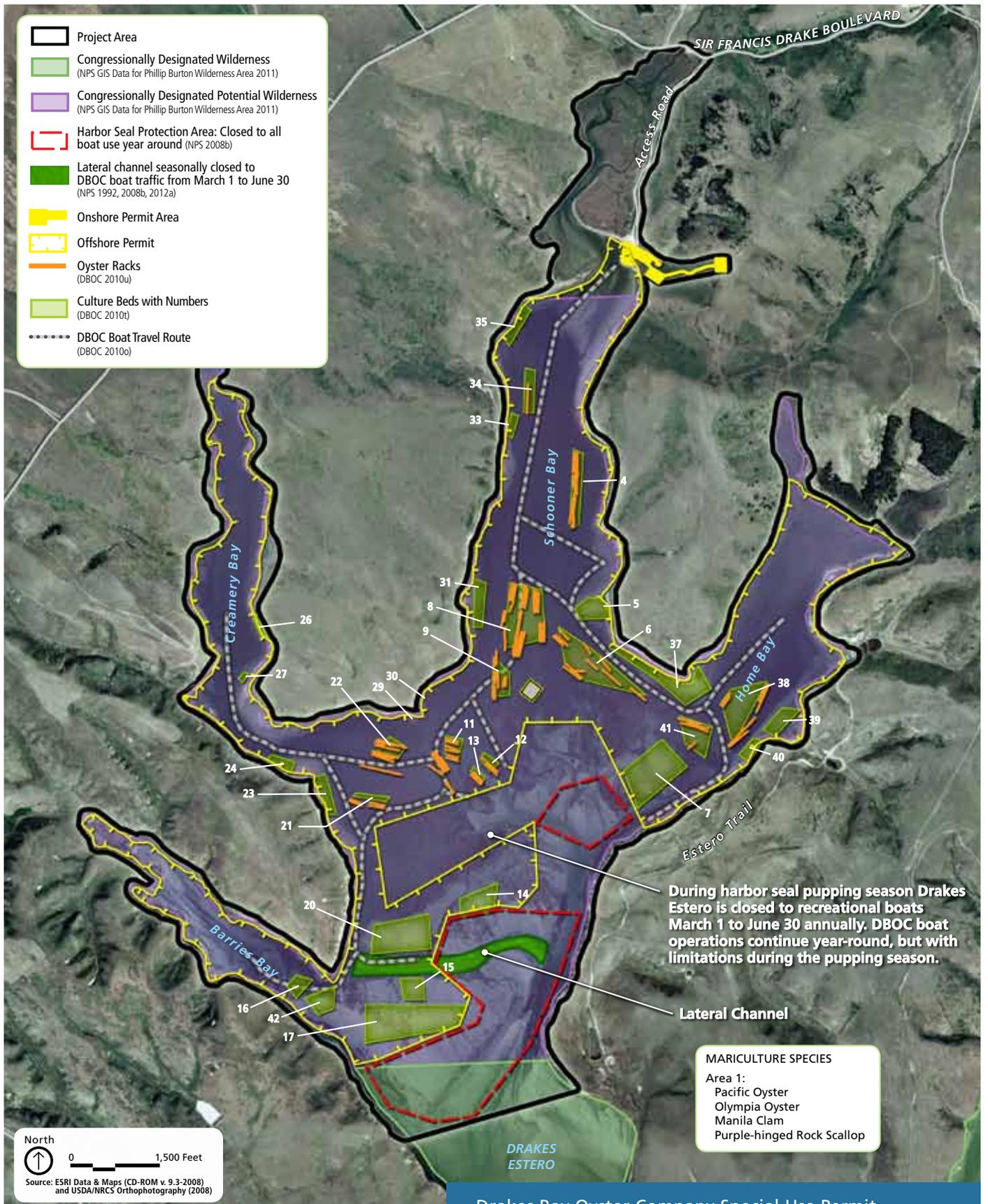
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FIGURE ES-10
Alternative C: Issue New Special Use Permit – Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would be Allowed for a Period of 10 Years (Onshore Operations)

ALTERNATIVE D: ISSUE NEW SPECIAL USE PERMIT—EXPANDED ONSHORE DEVELOPMENT AND OFFSHORE OPERATIONS WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Alternative D considers expansion of operations and development of new infrastructure as requested by DBOC as part of this EIS process, as well as items requested of other agencies. The existing SUP and RUO expire on November 30, 2012. Under alternative D, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative D:

- Two development proposals submitted by DBOC are evaluated at the conceptual level in this EIS. Additional planning, design, environmental compliance (including NEPA), and approval would be required prior to proceeding with construction of proposed new facilities. Infrastructure would remain until November 30, 2022.
- The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 1,087 acres, which incorporates the boundary adjustment requested by DBOC.
- With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
- Mariculture activities, including boat operations, would only take place within the established SUP area.
- Shellfish production would not exceed 850,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This production level is based on DBOC's projections of maximum production levels (submitted to CCC).
- Pacific oysters, Manila clams, Olympia oysters, and purple-hinged rock scallops could be cultivated in documented shellfish growing areas within the offshore permit area using rack culture, floating culture, or bottom bag culture methods. The 1-acre plot, currently known as Lease M-438-02, would not be maintained as a distinct shellfish growing area.
- DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.
- NPS would evaluate future requests from DBOC for consistency with the intent of this alternative, which is to allow for expanded operations within the scope of the conceptual proposal; approval/compliance for future development would be through a tiered planning process.
- By November 30, 2022, DBOC would be responsible for the removal of all infrastructure developed under this alternative, as well as all personal property. DBOC would be required to restore the area to good order and condition.



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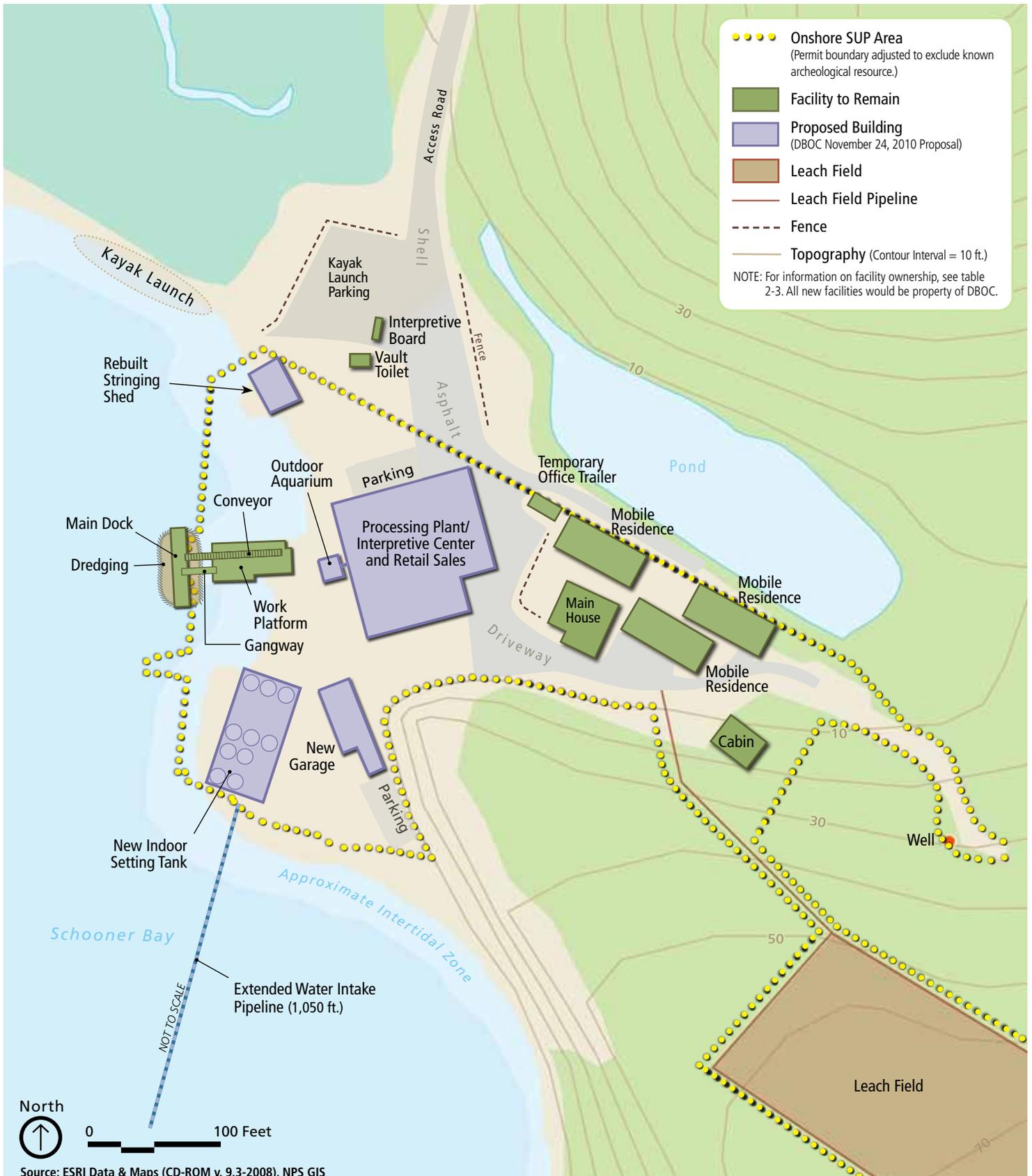
FIGURE ES-11

Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Offshore Operations)



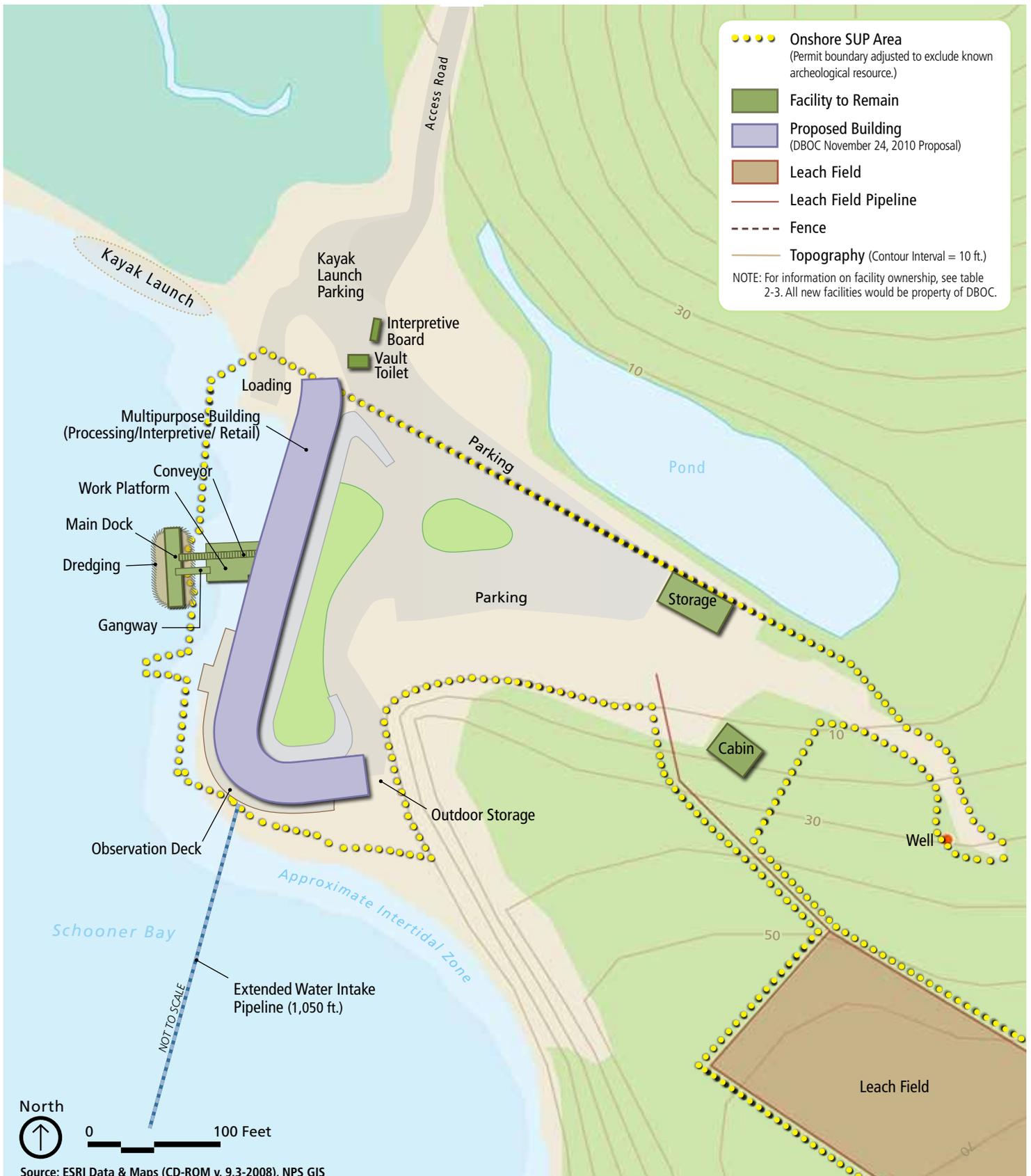
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FIGURE ES-12
Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations – Option 1)



●●●● **Onshore SUP Area**
 (Permit boundary adjusted to exclude known archeological resource.)

 Facility to Remain

 Proposed Building
 (DBOC November 24, 2010 Proposal)

 Leach Field

Leach Field Pipeline

Fence

Topography (Contour Interval = 10 ft.)

NOTE: For information on facility ownership, see table 2-3. All new facilities would be property of DBOC.

Source: ESRI Data & Maps (CD-ROM v. 9.3-2008), NPS GIS Data, and Cal-Atlas Geospatial Clearinghouse Data

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FIGURE ES-13
Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations – Option 2)



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SUMMARY OF THE ALTERNATIVES

Table ES-3 provides a summary of the alternatives presented above.

TABLE ES-3. SUMMARY OF ALTERNATIVES

	Alternative A: No New Special Use Permit—Conversion to Wilderness (No-action)	Alternative B: Issue New Special Use Permit—Existing Onshore Facilities and Infrastructure and Offshore Operations Would Be Allowed for a Period of 10 Years	Alternative C: Issue New Special Use Permit—Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would Be Allowed for a Period of 10 Years	Alternative D: Issue New Special Use Permit—Expanded Onshore Development and Offshore Operations Would Be Allowed for a Period of 10 Years
New SUP	Existing authorizations expire on November 30, 2012. No new SUP for DBOC operations would be issued.	A new SUP for DBOC operations would be issued, expiring on November 30, 2022.	Same as alternative B.	Same as alternative B.
Mariculture Species	N/A	Area 1 (1,077 acres): <ul style="list-style-type: none"> ▪ Pacific oysters ▪ Manila clams* Area 2 (1.0 acre): <ul style="list-style-type: none"> ▪ Purple-hinged rock scallops 	Area 1 (896 acres): <ul style="list-style-type: none"> ▪ Pacific oysters Area 2 (1.0 acre): <ul style="list-style-type: none"> ▪ Purple-hinged rock scallops 	Area 1 (1,082 acres): <ul style="list-style-type: none"> ▪ Pacific oysters ▪ Olympia oysters ▪ Manila clams ▪ Purple-hinged rock scallops Area 2 would be removed.
Acquisition of Larvae and Seed	N/A	Imported.	Imported.	Pacific oysters and Manila clams imported. Olympia oysters and purple-hinged rock scallops collected on site.
Culture Methods	N/A	<ul style="list-style-type: none"> ▪ Japanese hanging culture ▪ French tube culture ▪ Bottom bags ▪ Floating bags ▪ Floating trays 	Same as alternative B.	Same as alternative B.
Production Limits [†]	N/A	600,000 pounds	500,000 pounds	850,000 pounds

* Items have not previously been permitted by NPS

[†] PRODUCTION LIMITS ARE EXPRESSED AS A ROLLING THREE YEAR AVERAGE OVER THE CURRENT YEAR AND THE TWO PREVIOUS YEARS AND ARE INCLUSIVE OF ALL SHELLFISH SPECIES. THESE PRODUCTION LIMITS WERE DEVELOPED ASSUMING 100 INDIVIDUAL OYSTERS PER GALLON AND 8.5 POUNDS PER GALLON.

N/A = NOT APPLICABLE

TABLE ES-3. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
Offshore Permit Boundaries	N/A	<p>Offshore SUP boundaries would be based on existing leases, with two adjustments to Area 1: (1) The two parcels would be joined in Schooner Bay to allow boats to use the main channel and (2) areas within harbor seal protection areas would be excluded.</p> <p>Area 2 would be maintained for cultivation of purple-hinged rock scallops.</p> <p>Offshore permit area would include 1,078 acres.</p>	<p>Area 1 would be the same as alternative B except the southeast boundary of alternative C would follow either the harbor seal protection area boundary or the proposed DBOC shellfish growing area boundary, whichever is more protective of established harbor seal haul-out areas.</p> <p>Area 2 would be maintained for cultivation of purple-hinged rock scallops.</p> <p>Offshore permit area would include 897 acres.</p>	<p>Offshore SUP boundaries would be based on DBOC's proposed adjustment of the shellfish growing area boundary, with the same two adjustments noted under alternative B.</p> <p>Area 2 would not be maintained as a separate growing area.</p> <p>Offshore permit area would include 1,082 acres.</p>
Offshore Infrastructure	All aquaculture materials, including racks, bags, and other materials would be removed from Drakes Estero as part of closeout activities. Approximately 179,000 linear feet of pressure treated lumber would be removed in addition to removal of remaining culture material.	Regular maintenance of racks, following initial repairs as proposed by DBOC (repair/replace 50 racks in 2013 and another 25 racks in 2014).	Same as Alternative B	Same as Alternative B
Vessel Transit Plan	N/A	A vessel transit plan for DBOC boat use within Drakes Estero would be developed and submitted to the NPS for approval.	Same as alternative B.	Same as alternative B.

N/A = not applicable

TABLE ES-3. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
DBOC Boat Operations	Use of motorized boats in Drakes Estero would cease.	Three motorboats and two nonmotorized barges would be operated in Drakes Estero, approximately 12 trips per day, 8 hours a day, combined.	Same as alternative B.	Same as alternative B, except boat operations may increase due to increased production limits.
Harbor Seal Protection Protocol	N/A	The existing protocol would be included in the new SUP, including seasonal closure of lateral channel and maintenance of a 100-yard buffer from any hauled-out harbor seal at any location and time by DBOC boats and staff.	Same as alternative B.	Same as alternative B.
Onshore Permit Boundaries	N/A	Onshore SUP boundaries would be based on existing NPS authorizations, excluding a known archeological resource. Onshore permit area would total 4.3 acres, including the areas used for water and septic utilities.	Same as alternative B.	Same as alternative B.
DBOC Onshore Facilities: Staff Housing	The main house and cabin would remain as NPS property following SUP expiration. DBOC would be responsible for removing mobile homes following expiration of the SUP.	On-site housing would be provided for DBOC staff in 2 permanent houses and 3 mobile homes, providing a total of 14 bedrooms.	Same as alternative B.	The level of staff housing that would be provided under this alternative has not been determined.
DBOC Onshore Facilities: Picnic Areas	Picnic tables and associated materials are considered personal property and would be removed by DBOC upon expiration of the SUP.	A dozen picnic benches would be provided for DBOC visitors in existing areas.*	Picnic area would be provided at DBOC next to the office/warehouse.	A picnic area with 18 tables and 12 grills may be provided within the SUP area.

* Items have not previously been permitted by NPS

N/A = not applicable

TABLE ES-3. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
DBOC Onshore Facilities: Processing Plant	DBOC would remove private property within the building. This building is NPS property and would remain on site.	The existing single-story processing plant would continue to house shellfish processing, retail, and interpretive facilities at the existing scale.	Same as alternative B.	The existing processing plant would be removed and replaced in some form by a larger building.
DBOC Onshore Facilities: Cannery	This temporary structure was placed by DBOC and would be removed following SUP expiration.	The cannery would continue to be housed in the existing shipping container. ^a	Same as alternative B.	The temporary cannery container would be removed and this function served within the new larger processing plant.
DBOC Onshore Facilities: Setting Tanks	These structures are considered personal property. DBOC would be responsible for removal following the expiration of the SUP.	Seeding would take place in the existing tanks (indoor and outdoor ^a).	Same as alternative B.	A new seeding plant may be constructed to replace the existing facilities.
Wilderness Status	Following removal of nonconforming uses in Drakes Estero, the congressionally designated potential wilderness would be converted to congressionally designated wilderness in 2012.	A new SUP would be issued for DBOC operations until November 30, 2022. This would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness for 10 years.	Same as alternative B.	Same as alternative B.
Other NPS Operations and Facilities	The existing access road, parking lot, interpretive board, and vault toilet would be maintained. The NPS also would install a gate to limit recreational access to Drakes Estero during harbor seal pupping season.	Same as alternative A, without the addition of the gate.	Same as alternative A, without the addition of the gate.	Same as alternative A, without the addition of the gate.

^a Items have not previously been permitted by NPS

ENVIRONMENTAL CONSEQUENCES

Impacts of the alternatives were assessed in accordance with NPS Director's Order 12 and Handbook: *Conservation Planning, Environmental Impact Analysis and Decision-Making* (NPS 2001b). The summary of environmental consequences considers the actions being proposed and relevant cumulative impacts. The potential environmental consequences of the actions are addressed for wetlands and other waters of the U.S., eelgrass, wildlife and wildlife habitat (benthic fauna, fish, harbor seals, and birds), special-status species, coastal flood zones, water quality, soundscapes, wilderness, visitor experience and recreation, socioeconomic resources, and NPS operations.

For each impact topic, methods were identified to measure the change in the Seashore's resources that would occur with implementation of each of the action alternatives. Intensity definitions are derived from relevant standards based on law, policy, regulations, NPS *Management Policies 2006*, scientific literature and research, or best professional judgment. Intensity definitions may vary by impact topic; therefore, they are provided separately for each impact topic analyzed in the Final EIS. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major adverse impacts. The CEQ regulations advise (40 CFR 1500.2), and NPS *Management Policies 2006* require, that managers minimize and avoid adverse impacts on park resources. Standard NPS NEPA practice, as reflected in the Director's Order 12 Handbook and elsewhere, thus focuses on mainly such adverse effects. Beneficial effects are discussed and analyzed, wherever present, but generally only in a qualitative manner.

The "Environmental Consequences" chapter of the Final EIS uses the best available scientific literature applicable to the region and setting to predict the expected impacts of each alternative, including the no-action alternative, using the existing condition (baseline) described in "Chapter 3: Affected Environment" as the starting point for the analysis. As noted by Bass, Herson and Bogdan, "[i]t is easy to confuse the baseline with the no-action alternative" (2001). They go on to explain "[t]he baseline is essentially a description of the affected environment at a fixed point in time, whereas the no-action alternative assumes that other things will happen to the affected environment even if the proposed action does not occur" (2001). The environmental consequences associated with each alternative, discussed according to impact topic, are summarized in table ES-4 below, and are detailed in chapter 4 of the EIS.

A main resource used in development of this EIS was the NAS report, *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* (NAS 2009). The report provides an intensive review of pertinent scientific literature on this subject. Although an exhaustive review of additional references took place during the drafting on this Final EIS, there remains much overlap between the literature cited in that document and the references used to support this EIS.

A number of guiding assumptions were made to provide context for the impact analysis based on the NAS (2009) report and the descriptions of the alternatives summarized in table 2-5 above.

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Wetlands and Other Waters of the U.S.			
<p>Overall, alternative A would result in long-term beneficial impacts on wetlands and other waters of the U.S., in the project area. Structures, processes, and functions of the wetlands and other waters of the U.S. would not be permanently affected as a result of actions from alternative A. However, climate change over the long term may result in sea level rise and the year-round inundation of current intertidal marsh. Vegetated wetlands in Drakes Estero occupy available habitat in the upper bays, and while tidal vegetation has the ability to shift with sea level rise, there is little room for vegetation to shift landward along much of the Drakes Estero shoreline due to the steep sideslopes of the surrounding terrain. The removal of personal property would increase the potential that approximately 3.8 acres of the project area could be converted back to historical wetland habitat at the onshore facilities. The removal of approximately 7 acres of racks and up to 88 acres of bags from nonvegetated sandbars and mudflats in Drakes Estero would allow benthic organisms and eelgrass in Drakes Estero to recolonize the space previously occupied by the commercial shellfish operation infrastructure (see "Impacts on Eelgrass" and "Impacts on Wildlife and Wildlife Habitat: Benthic Fauna" sections). Additionally, erosive forces on sediments caused by tidal water flowing across and around bags would be eliminated, restoring natural hydrodynamics in up to 88 acres of sandbars and mudflats currently available for use by DBOC. The reduction of propeller-caused turbidity in the water column also would result in increased sunlight penetration and therefore increased primary production.</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative B would be short-term, minor, and adverse and long-term, moderate, and adverse. In the 138 acres of documented culture beds, bottom bags with anchors and floating lines on up to 84 acres of tidal mudflats/sandbars and 5 miles (7 acres) of racks with floating bags/trays and anchors in subaquatic habitats would continue to occupy estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Impacts associated with these offshore structures would include intermittent disturbances to mudflats and sandbars from the placement and rotation of bags/trays, lines and anchors, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. The impacts associated with these actions would be slightly greater than alternative C but less than those described under alternative D. Onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, or functions of the wetlands and other waters of the U.S. for an additional 10 years. Temporary impacts would be associated with dredging under the new dock. Dredging would occur in a 30-by 60-foot area at the dock. Approximately 1,700 to 2,500 2-inch by 6-inch posts would be installed outside harbor seal pupping season during 2013, and</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative C would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars and 7 acres of subaquatic habitat for the racks would continue to disturb estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Racks would be replaced on a schedule of 50 racks in year 2013 and 25 racks in year 2014. The replacements would occur over a few months in each year. Floating culture would likely continue, either attached to racks or using concrete anchors adjacent to racks, but at a reduced level compared to existing operations. Therefore, impacts to wetlands and other waters of the U.S. would be slightly reduced compared to alternative B. Of the 138 acres available for use, bottom bags have been placed on a rotational basis in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Other than the physical presence of structures in wetlands and other waters of the U.S., additional impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. As under alternative B, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S.</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative D would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars would continue under alternative D. Of the 138 acres available for use, bottom bags have been placed in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Racks would be replaced or repaired, and the use of floating culture would continue adjacent to racks resulting in the use of concrete anchors. In addition to the physical objects placed in wetlands and other waters of the U.S., other impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the mud bottom. Because of the potential for higher production under this alternative (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), the impacts associated with these actions would likely be greater than those under alternatives B and C but are still expected to be at a moderate level. As under alternatives B and C, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years.</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>The removal of racks, including approximately 4,700 posts (2-inch by 6-inch boards), and the removal of bags from up to 88 acres of mud flats would result in short-term minor adverse impacts on wetlands and other waters of the U.S. because of temporary bottom disturbances. Standard BMPs would be used during the removal of racks to minimize sediment disturbances and water turbidity. The increase in turbidity would be highly localized and would occur over a two to three month period. Governmental permit authorization from the USACE would not likely be required. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>With respect to wetlands and other waters of the U.S., alternative A would be consistent with relevant law and policy. The natural recovery of wetlands would be consistent with NPS <i>Management Policies 2006</i> and DO-77-1, which sets a goal of a "net gain" of wetlands (NPS 2006d, 2002a). USACE would be consulted to determine whether the removal of commercial shellfish infrastructure would require permitting.</p>	<p>approximately 380 to 750 posts would be installed outside the harbor seal pupping season in 2014. Dredging and rack installation and repair would adversely impact the silted bottom of Drakes Estero. The post installation and rack repair would be conducted over a few months in each year, and impacts from dredging and post installation and rack repair would be expected to last one week (from disturbance) due to a localized increase in suspended sediments. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits, and complying with all permit conditions. By obtaining state and federal permits and complying with their conditions, DBOC would ensure that alternative B is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. DBOC has received written confirmation that shellfish operations fall within USACE jurisdiction and a permit application is required to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the USACE that any proposed fill is necessary because there are no practicable alternatives, as outlined in the EPA's section 404(b)(1) Guidelines" (USACE 2010).</p>	<p>would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Temporary impacts would be associated with dredging under the new dock in a 30- by 60-foot area where the old dock is located and the installation/replacement of new rack infrastructure, including between 1,700 and 2,500 2-inch by 6-inch posts in 2012 and 380 to 750 posts in 2014. These actions would adversely impact the silted bottom of Drakes Estero due to a localized increase in sedimentation during the period of construction. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining the relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative C is consistent with relevant law and policy related to the management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. For the reasons described under alternative B, dredging the area around the dock and installation of a new dock would not qualify for the NWP 48, and would require a separate USACE permit.</p>	<p>Temporary impacts include dredging under the new dock (in a 30-by 60-foot area) at the onshore facilities and the installation/replacement of new rack infrastructure including between 1,700 and 2,500 2-inch by 6-inch posts in 2013 and 380 to 750 posts in 2014. DBOC would also place a new 1,050-foot water collection pipeline along the bottom of Drakes Estero using concrete anchors. The construction of a new processing facility would occur on existing uplands. These actions are expected to result in minimal short-term, adverse impacts due to an increase in local turbidity levels. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative D is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. Installation of the intake pipe, installation of a new dock, and dredging the area around the dock would require USACE permit authorization. NWP 48 (Commercial Shellfish Aquaculture Activities) was issued on February 21, 2012 with modifications. This permit authorizes "discharges of dredged or fill material in waters of the United States or structures or</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>NWP 48, described under “Laws and Policies” in this section, authorizes “discharges of dredged or fill material in waters of the U.S. or structures or work in navigable waters of the U.S. necessary for commercial shellfish aquaculture operations in authorized areas” (33CFR 330[B][48]), provided notification is submitted to the USACE and includes a compensatory mitigation plan, habitat assessment, and assessment of impacts to eelgrass. Dredging the area around the dock and installing a new dock would not qualify for the NWP 48, and would require a separate USACE permit.</p> <p>Lastly, any future actions would be reviewed by NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>	<p>USACE has provided written notification to DBOC that the commercial shellfish activities in waters of the U.S. are regulated by USACE and has advised DBOC to submit an application to ensure that its activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to “demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency’s Section 404(b)(1) Guidelines” (USACE 2010).</p> <p>Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>	<p>work in navigable waters of the United States necessary for commercial shellfish aquaculture operations in authorized areas” (33CFR 330[B][48]). Dredging the area around the dock and installing a new dock would not qualify for NWP 48, and would require a separate USACE permit. USACE has provided written notification to DBOC that the activities are within USACE jurisdiction and has advised DBOC to submit a permit application to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to “demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency’ Section 404(b)(1) Guidelines” (USACE 2010).</p> <p>Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock and placement of the water intake line) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>
Eelgrass			
<p>Overall, alternative A would result in long-term beneficial impacts on eelgrass habitat due to the termination of DBOC operations in Drakes Estero, the removal of scarring with discontinued use of motorboats in Drakes Estero, and the removal of structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for the expansion of invasive species (e.g., tunicates) and macroalgae. There may be some highly localized adverse impacts on eelgrass associated with the removal of the commercially grown</p>	<p>Overall, alternative B would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for another 10 years and the continued presence of commercial shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative B would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), potential boat wake erosion, and potential</p>	<p>Overall, alternative C would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for an additional 10 years and the continued presence of shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative C would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from</p>	<p>Overall, alternative D would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to an additional 10 years of DBOC operations. DBOC activities in Drakes Estero under alternative D would allow the continuation of and potential increase in actions associated with commercial shellfish operations that result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from sediment resuspension. It is anticipated that due to the</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>shellfish because they provide some benefits associated with nutrient cycling and water filtration; however, the overall long-term impacts of alternative A on eelgrass would be beneficial. Alternative A also would result in short-term minor adverse impacts on eelgrass because removing infrastructure related to commercial shellfish operations would result in localized, slightly detectable increases in sedimentation that would last two to three months, reducing the amount of sunlight available for photosynthesis during that time. BMPs would be used to reduce turbidity effects from temporary resuspension of sediment during removal activities, and the overall impact would result in limited change to eelgrass meadows or natural processes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative A is consistent with relevant law and policy because it would preserve and enhance (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes encouraged by NPS <i>Management Policies 2006</i>.</p>	<p>temporary increases in turbidity from sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that the amount of scarring under alternative B would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities and the presence of structures would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, the latter of which can compete with seagrasses for important resources like light. These effects would have a long-term moderate adverse impact on eelgrass, which would be readily apparent and would affect eelgrass meadows and natural processes (such as eelgrass colonization and regeneration) through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Mitigation for impacts to eelgrass would be required pursuant to California policy. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation sites. In general, impacts would be clearly detectable and could appreciably affect individuals or groups of species, communities, or natural processes. The NAS concluded that commercial shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset</p>	<p>sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that because the level of boat use would remain similar to existing conditions, the amount of scarring under alternative C would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. However, DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for <i>Didemnum</i> to spread to other areas in the Estero through fragmentation. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around structures in Drakes Estero associated with commercial shellfish operations.</p> <p>In general, impacts would be readily apparent and would affect eelgrass meadows or natural processes through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. The NAS concluded that shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset by the “rapid regeneration capacity” for eelgrass and “that</p>	<p>likely increase in boat traffic and area of vessel operations that the potential for scarring may be increased from the levels observed in the 2010 aerial photography. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. These adverse impacts would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with the increased level of production (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), and the increased use of bags and racks in shellfish operations, but are still expected to be of a moderate intensity. Impacts would be readily apparent and would affect eelgrass meadows or natural processes (such as eelgrass colonization and regeneration). Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation-related structures. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative D would not further the goals set forth in existing law and policy because it would allow ongoing adverse</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>by the “rapid regeneration capacity” for eelgrass and that “eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration” (NAS 2009). Although there are some highly localized beneficial impacts on eelgrass associated with commercial shellfish operations, the overall impact of alternative B on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative B would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>	<p>eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration” (NAS 2009). Although there would be some highly localized beneficial impacts on eelgrass associated with shellfish operations, the impact of alternative C on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With respect to eelgrass, alternative C would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>	<p>impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>
Wildlife and Wildlife Habitat: Benthic Fauna			
<p>Overall, alternative A would result in long-term beneficial impacts on native benthic fauna because the termination of DBOC operations and associated shellfish operations in Drakes Estero would remove shellfish operations from Drakes Estero and, therefore, reduce the risk for the spread of nonnative and invasive species in the future. Alternative A would result in the removal of structures related to shellfish operations in Drakes Estero. Some sediment re-suspension would be anticipated during the removal of the 7 acres of racks; however, any sedimentation resulting from</p>	<p>Overall, alternative B would result in long-term moderate adverse impacts on native benthic fauna for an additional 10 years due to the continuation of DBOC operations and associated human activities in Drakes Estero, as well as the potential for such activities to introduce and/or facilitate the colonization of nonnative and invasive species. Specifically, the cultivation of nonnative species in Drakes Estero for an additional 10 years at production levels of 600,000 pounds of shellfish annually would result in the continued addition and subsequent harvest</p>	<p>Overall, alternative C would result in long-term moderate adverse impacts on benthic fauna due to an additional 10 years of commercial shellfish operations and associated human activities in Drakes Estero and the potential for such activities to introduce nonnative species and to facilitate the colonization and expansion of invasive species. Although Manila clams would no longer be cultivated under this alternative, the cultivation of Pacific oyster in Drakes Estero would have readily apparent effects on the communities of natural benthic organisms, including increasing the risk of</p>	<p>Overall, alternative D would result in long-term moderate adverse impacts on native benthic fauna due to an additional 10 years of DBOC operations and associated human activities in Drakes Estero. This would increase the potential for shellfish operations to introduce nonnative species to Drakes Estero and facilitate the colonization and expansion of invasive species. Specifically, the increase in shellfish production levels to 850,000 pounds shucked weight (approximately 10 million individual organisms harvested annually) represents a marked</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>this activity would be short-lived and would be reduced to the extent practicable using BMPs, making the impact undetectable in the benthic community and therefore negligible. Although artificial habitat for certain benthic species would be removed when DBOC's offshore infrastructure is removed, alternative natural habitats (e.g., eelgrass beds) would be expected to replace these structures. Further, the removal of structures under alternative A would remove substrates that support invasive tunicates and other fouling species. Native benthic species would benefit from the removal of offshore infrastructure, particularly from the approximately 88 acres of mudflats and sandbars where bottom bags can be placed (22 acres have been planted with bottom bags each of the past two years). Native benthic species are adapted to the soft-bottom habitat and eelgrass that would likely replace the structures related to shellfish operations once they are removed. The cumulative impact would be beneficial, and alternative A would contribute an appreciable beneficial increment to the beneficial cumulative impact.</p> <p>Alternative A would be consistent with the guidance set forth in NPS <i>Management Policies 2006</i> for the maintenance and restoration of natural native ecosystems, including the eradication of nonnative species where these species interfere with natural processes and habitat (NPS 2006d). Alternative A would also be consistent with Executive Order 13112 regarding invasive species management. Finally, alternative A would be consistent with the California MLPA, regarding protection of marine life and habitats, marine ecosystems, and marine natural heritage, and improvements to recreational, educational, and study opportunities provided by marine ecosystems subject to minimal human disturbance.</p>	<p>of approximately 7.06 million individual shellfish from Drakes Estero on an annual basis. Based on DBOC proof-of-use reports, the acreage of sandbars and mudflats occupied at this level of production would be 50 percent greater than that reported for 2008 in the 2009 NAS report. The effects on the natural benthic community from this would be readily apparent, including the continued use by nonnative species of resources that would otherwise be available to native species of bivalves and other benthic organisms, the introduction of molluscan diseases, and other harmful nonnative species being imported unintentionally (such as the invasive tunicate <i>Didemnum</i>). The use of both bottom bags and racks has been implicated in detectable changes in benthic communities. The continued maintenance and use of DBOC offshore infrastructure would result in a slight decrease in the abundance of certain benthic invertebrate species where the racks are currently located, while the continuation of bag cultivation in Drakes Estero would maintain artificial structured habitat for some benthic invertebrates. Rack repair and replacement would result in short-term negligible adverse impacts to benthic fauna, because the effects from these activities would not be detectable or measurable. Activities such as continued maintenance and harvesting would allow for incidental mortality to continue, as described above, which would have an adverse impact on native bivalves. Further, the continued use of offshore infrastructure would maintain the potential for <i>Didemnum</i> expansion, and associated shellfish operations (such as continued infrastructure maintenance, vessel traffic, and harvesting) would pose a risk for further dispersal of this nonnative invasive tunicate via colonial fragments. The potential for increase in overall coverage of <i>Didemnum</i> would</p>	<p>introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate <i>Didemnum</i>). As discussed under alternative B, DBOC's use of diploid stock rather than sterile triploid stock increases the risk of naturalization by cultivated species (NAS 2004), although the potential risk under alternative C would be incrementally less than under alternative B. DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for <i>Didemnum</i> to spread to other areas in Drakes Estero through fragmentation. The use of both bottom bags and racks has contributed to detectable changes in benthic communities. Because shellfish production limits would be less under alternative C compared to alternatives B and D, the level of impact on benthic fauna would be incrementally less; however, the impacts would still be readily apparent and would affect benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible (i.e., not detectable or measurable). Cumulative impacts would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of the policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. All species that could be cultivated are nonnative with the exception of the</p>	<p>increase over alternatives B and C (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); therefore, it is assumed alternative D would result in the greatest level of impact on native benthic fauna among all alternatives. The cultivation of nonnative species in Drakes Estero would be readily apparent and would affect populations, natural processes, and/or the habitat of natural benthic organisms, including increasing the risk of introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate <i>Didemnum</i>). While certain species introduced under alternative D are native to the region (i.e., purple-hinged rock scallops and Olympia oysters), they are not abundant in Drakes Estero in adult form. The use of both bottom bags and racks has contributed to detectable changes in benthic communities. These impacts would continue to be readily apparent, affecting benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible. Cumulative impacts would be long term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of these policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>have an adverse impact on species diversity. Lastly, the nonnative Manila clam and Pacific oyster would continue to be produced under this alternative, increasing their chance for naturalization (NAS 2004, 2009; Grosholz 2011b). DBOC's use of diploid stock rather than sterile triploid stock further increases the risk of naturalization by cultivated species (NAS 2004). These impacts would be readily apparent on the populations, natural processes, and/or habitat of benthic organisms in the project area. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The shellfish species that could be cultivated under this alternative are nonnative, with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative B would not be consistent with Executive Order 13112 regarding invasive species management.</p>	<p>purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative C would not be consistent with Executive Order 13112 regarding invasive species management.</p>	<p>rocky California coast but is not likely to be found in abundance in Drakes Estero, and the Olympia oyster, which also prefers a hard substrate and is not abundant in adult form in Drakes Estero. Additionally, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per <i>Management Policies 2006</i> (NPS 2006d) or regulations. Further, alternative D would not be consistent with Executive Order 13112 regarding invasive species management.</p>
Wildlife and Wildlife Habitat: Fish			
<p>Overall, alternative A would result in long-term beneficial impacts on fish due to the restoration of natural fish habitat, including the restoration of natural eelgrass beds that serve as essential fish habitat for a variety of Pacific groundfish identified</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on fish because, as discussed above, impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural</p>	<p>Overall, alternative C would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>in the Groundfish Plan (PFMC 2008). Alternative A would result in a more natural species composition and spatial distribution of fish in the project area, which would likely result in minor adverse impacts on fish due to slightly detectable decreases in the abundance of structure-oriented fish species and their prey. Alternative A would also result in short-term minor adverse impacts on fish species because the disruption of fish during rack removal from Drakes Estero would be slightly detectable and would affect only a small portion of the population and/or habitat in the project area. Combined with the removal of a source of marine debris, changes resulting from this alternative would return the Drakes Estero ecosystem to a more natural state for the overall fish community. The cumulative impact for alternative A would be beneficial and would contribute a noticeable beneficial increment to the overall cumulative impact.</p> <p>Alternative A would be consistent with the guidance set forth in NPS <i>Management Policies 2006</i> for the maintenance and restoration of natural native ecosystems, including the restoration of native fish communities (NPS 2006d). Additionally, this alternative would be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because the essential fish habitat (habitat of particular concern) designated in the Pacific Fishery Management Council's Groundfish Plan would be maintained and improved.</p>	<p>processes, and/or their habitat within the project area. While the natural species composition would remain altered due to the presence of nonnatural structured habitat, these alterations would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Additionally, eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The continued maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish identified in the Groundfish Plan (PFMC 2008). Shellfish rack repair and replacement would have the potential to degrade fish habitat by affecting water quality, but impacts would be short term due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall beneficial cumulative impact.</p> <p>With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to</p>	<p>localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is identified as essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative C would contribute a noticeable adverse increment to the overall beneficial cumulative impact.</p> <p>With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes</p>	<p>localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the beneficial cumulative impact.</p> <p>With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.	Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.	Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) within the Pacific Fishery Management Council's Groundfish Management Plan, would continue.
Wildlife and Wildlife Habitat: Harbor Seals			
<p>Overall, alternative A would result in long-term beneficial impacts on harbor seals due to the termination of DBOC operations and associated human activities in Drakes Estero. Disturbance to harbor seals would be limited to recreational kayakers (outside of the harbor seal pupping season), hikers on the adjacent landscape and shoreline, and aircraft. Further, the termination of shellfish operations in Drakes Estero could benefit the distribution and abundance of the native harbor seal population, and could result in expansion of available habitat for harbor seals.</p> <p>Alternative A could also result in short-term minor adverse impacts associated with rack removal, which would be localized and slightly detectable but would not affect the overall structure of the natural community (i.e., would affect only a small segment of the harbor seal population, natural processes, or habitat in the project area). These activities would be conducted outside the harbor seal pupping season to minimize adverse impacts. The cumulative impact would be long term and beneficial, including the removal of marine debris from Drakes Estero, and alternative</p>	<p>Overall, alternative B would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained as part of the new SUP issued to DBOC, alternative B would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of marine debris into the</p>	<p>Overall, alternative C would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative C would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the</p>	<p>Overall, alternative D would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative D would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the commercial</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>A would contribute an appreciable beneficial increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative A would be consistent with NPS policy because the removal of DBOC operations from Drakes Estero would remove an unnatural stimulus that is correlated with changes in harbor seal behavior. Similarly, the decrease in potential disturbance of this species would be consistent with MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107) by avoiding any potential take (as described above) of marine mammals and by maintaining the health and stability of the marine ecosystem.</p>	<p>environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative B would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS <i>Management Policies 2006</i> specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.</p>	<p>commercial shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative C would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that is negatively correlated with harbor seal use of haul-out sites. NPS <i>Management Policies 2006</i> specify that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.</p>	<p>shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The adverse impacts associated with alternative D would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with increased production levels (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); however, these impacts are still expected to be moderate in intensity. The cumulative impact would be long term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative D would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS <i>Management Policies 2006</i> specify that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
			by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.
Wildlife and Wildlife Habitat: Birds			
<p>Overall, alternative A would result in long-term beneficial impacts on birds due to the removal of the commercial shellfish operation in Drakes Estero and its associated human activities. The removal of DBOC motorboats and related activities would minimize the disruption of biological activities such as foraging and resting for various types of birds that use Drakes Estero. Intertidal areas previously used by DBOC for the bottom bag cultivation in commercial operations would result in up to 88 additional acres of foraging, roosting, and resting habitat for resident and migratory birds. This increase in bird habitat would have greater importance for spring migrating birds, like the Pacific black brant, and natural processes would be enhanced due to the closure of Drakes Estero to all recreational boat access during the seal pupping season (March 1 – June 30). Alternative A may result in adverse impacts on birds from rack removal, due to the removal of food sources and resting habitat associated with the racks. However, these adverse impacts would be expected to be short term and minor because they would affect a small segment of bird populations, their natural processes, and habitat in the project area. Further, the removal of shellfish racks would eliminate unnatural habitat features and restore natural bird habitats in Drakes Estero. Under this alternative, birds would benefit from the removal of all racks and bags, thereby eliminating the</p>	<p>Alternative B would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. As described above, the impacts of alternative B on birds would result in readily apparent effects on bird populations, natural processes, and habitat within the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be minimal because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures in Drakes Estero, would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction</p>	<p>Alternative C would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and associated human activities in Drakes Estero for an additional 10 years. The impacts of alternative C on birds would result in readily apparent effects on bird populations, natural processes, and habitat in the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be minor because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive</p>	<p>Alternative D would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. The adverse impacts could be incrementally greater under this alternative than under alternatives B and C due to the potential for increased motorboat activities. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>potential for ingestion of debris from the commercial shellfish operation. Cumulative impacts would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impacts.</p> <p>Alternative A would be consistent with the goals set forth in both NPS <i>Management Policies 2006</i> and the MBTA. NPS <i>Management Policies 2006</i> specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). The MBTA (16 USC 703–712, as amended) makes it illegal for people to “take” migratory birds, or their eggs, feathers, or nests. Additionally, alternative A would be consistent with Executive Order 13186 and the NPS MOU with USFWS, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions (NPS and USFWS 2010).</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, because of restrictions on human activity (including kayaking and shellfish operations during the March 1 – June 30 seal pupping closure) and further alteration of tidal habitat, alternative A would be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative A would also be expected to support the primary</p>	<p>in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall impact.</p> <p>With respect to birds, alternative B would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative B would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative B would not be consistent with the NPS commitment to Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative B would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation</p>	<p>success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With respect to birds, alternative C would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative C would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative C would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative C would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation</p>	<p>fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The impacts of alternative D on bird populations, natural processes, and habitat within the project area. The cumulative impact would be long-term moderate adverse, and alternative D would contribute an appreciable adverse increment to the overall impact.</p> <p>With respect to birds, alternative D would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative D would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative D would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, the removal of DBOC shellfish operations would be expected to positively influence birds and bird habitat by supporting conservation strategies outlined in bird conservation plans.</p>	<p>measures into agency actions and planning processes. Actions under alternative B would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continuing alteration of tidal habitat, alternative B would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative B would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative B would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>	<p>measures into agency actions and planning processes. Actions under alternative C would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative C would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative C would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative C would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>	<p>Further, alternative D would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative D are consistent with the MBTA (16 U.S.C. 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, by allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative D would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative D would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative D would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>
Special-Status Species			
<p>Overall, alternative A would result in a long-term beneficial impact on central California Coho salmon critical habitat and the central California steelhead. Alternative A could also result in short-term minor adverse impacts on these federally protected resources during the removal of DBOC facilities and personal property because these activities could disturb individuals or cause temporary sedimentation in designated critical habitat. The short-term impacts related to removal</p>	<p>Overall, alternative B would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt a small proportion of the individuals and/or designated critical habitat in the project area. Damage to eelgrass habitat and changes in water quality have the potential to</p>	<p>Overall, alternative C would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt individuals and/or designated critical habitat within the project area. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on designated central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized (affecting a small proportion of the designated Coho salmon critical habitat and steelhead within the project area). Damage to eelgrass habitat and reduction in water quality</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>would be highly localized and would last for a period of two to three months. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative A would be consistent with relevant law and policy. Alternative A would forward the goal set forth in <i>NPS Management Policies 2006</i>, which states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). Alternative A would also fulfill the federal mandate set forth by the ESA to conserve listed species and to ensure that the proposed actions do not jeopardize the continued existence of the listed species.</p>	<p>cause localized and slightly detectable adverse impacts on Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative B would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a few months each year (outside of the seal pupping season) that would cause slightly detectable impacts to federally listed individuals or populations and critical habitat within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative B would be consistent with relevant law and policy. However, alternative B would not fulfill the goals</p>	<p>slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative C would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a period of two to three months per year that would be slightly detectable within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution is limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and beneficial, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative C would be consistent with relevant law and policy. However, alternative C would not fulfill the goals articulated in <i>NPS Management Policies 2006</i> as well as alternative A would. <i>NPS Management Policies 2006</i> states that the NPS will “survey for,</p>	<p>have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative D would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks could cause localized sedimentation for a few months each year during 2013 and 2014 (outside of the seal pupping season) that would be slightly detectable within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from commercial shellfish operation debris would not affect the overall structure of any natural community. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative D would be consistent with relevant law and policy. However, alternative D would not fulfill the goals articulated in <i>NPS Management Policies 2006</i> as well as alternative A would. <i>NPS Management</i></p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>articulated in NPS <i>Management Policies 2006</i> as well as alternative A would. NPS <i>Management Policies 2006</i> states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>	<p>protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>	<p><i>Policies 2006</i> states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>
Coastal Flood Zones			
<p>Overall, alternative A would result in long-term beneficial impacts on the coastal flood zone due to an increase in the flood storage capacity of the onshore area and the removal of structures and materials that have the potential to become dislodged and spread into habitat buffer areas, such as tidal vegetated wetlands and shorelines, during a flood event. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impacts.</p> <p>With respect to coastal flood zones, alternative A would be consistent with relevant law and policy. The removal of structures and residences in the flood zone would fulfill the goals set forth by Executive Order 11988, “Floodplain Management” and the subsequent NPS DO 77-2 and <i>Procedural Manual 77-2: Floodplain Management</i>, which are intended to properly conserve, manage, and protect flood zones on NPS lands to protect human health and the environment and prevent damage to property in the event of a flood event.</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on the coastal flood zone within the project area for an additional 10 years because continued DBOC operations would take place within the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities, and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and would not increase the potential for flood damage. Offshore structures and materials could be damaged and/or dislodged during a flood event, potentially causing damage to resources within Drakes Estero. Onshore, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent.</p>	<p>Overall, alternative C would result in long-term minor adverse impacts on the coastal flood zone within the project area for an additional 10 years because continued DBOC operations would take place within the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and would not increase the potential for flood damage. Offshore structures and materials could be damaged and/or dislodged during a flood event, potentially causing damage to resources within Drakes Estero. At the onshore facility, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent.</p>	<p>Overall, alternative D would result in long-term minor to moderate adverse impacts on the coastal flood zone due to continued shellfish operations. Structures would remain within the flood zone, which could result in an increased potential for flood damage to property or environmental contamination at the project site. Alternative D impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surges would be readily apparent. The additional infrastructure proposed under this alternative at the onshore facilities could result in the increased potential for flood damage within the project area compared to other alternatives. However, this could be mitigated by following guidelines set forth in NPS Procedural Manual 77-2, complying with Marin County building codes and FEMA recommendations for structures in the flood zone, and implementing architectural design elements specific to minimizing flood damage. Compared to alternatives B and C, alternative D would result in a slight increase of flood zone impacts from the offshore facilities due to additional racks and bottom bags to accommodate the higher shellfish</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>NPS guidelines require that new actions within the flood zone comply with <i>Procedural Manual 77-2: Floodplain Management</i>. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with <i>Procedural Manual 77-2</i> guidelines. No new structures would be constructed under alternative B. As such, this alternative would comply with existing NPS guidelines and procedures.</p>	<p>Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>NPS guidelines require that new actions within the flood zone comply with <i>NPS Procedural Manual 77-2: Floodplain Management</i>. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with <i>Procedural Manual 77-2</i> guidelines. No new structures would be constructed under alternative C. As such, this alternative would comply with existing NPS guidelines and procedures.</p>	<p>production level. The construction of new facilities may take place in the flood zone if alternative site locations outside the flood zone but within the SUP area were determined to be infeasible through a subsequent planning process. If located within the flood zone, the new facility would result in continued potential for flood damage to property and/or environmental contamination at the project site. Wastewater collection systems would remain as described in alternatives B and C, and flood zone impacts from other structures (punching shed, stringing shed, dock, washing station, and mobile homes) would be the same as those under alternatives B and C. An increase in production would likely result in additional shell being added to the shell piles located within the flood zone, resulting in a reduction of flood storage capacity. The cumulative impact would be long term minor to moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative D would include new onshore development, which is a Class I Action as specified in the <i>NPS Procedural Manual 77-2: Floodplain Management</i>. As such, the new structure would require a SOF if alternative site locations outside the coastal flood zone, but within the SUP area, were determined to be infeasible. The SOF process would ensure that the structure is properly designed and constructed in a way that minimizes impacts to the flood zone. However, any remaining structures are grandfathered, and do not have to comply with these guidelines.</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Water Quality			
<p>Drakes Estero is not a highly turbid coastal embayment (NAS 2009), and based on west coast research (Dumbauld, Ruesink, and Rumrill 2009), the beneficial biochemical effects typically attributed to bivalves, such as nutrient cycling and water clarity, are expected to be highly localized in Drakes Estero. This is because the nutrient dynamics in these systems are driven by coastal upwelling and a strong tidal cycle rather than by bioprocesses from shellfish. However, bivalves remove particulates in the water column that may influence eelgrass productivity near beds and racks (see discussion under alternative B).</p> <p>Overall, alternative A would result in long-term beneficial impacts on water quality as a result of reduced non-point-source runoff and the elimination of future disturbances to the Drakes Estero bottom from boats and offshore structures. No releases of toxic levels of copper from wood preservatives would be expected under this alternative. The removal of the racks and bags would cause a short-term minor adverse impact on water quality due to the sediment disturbances from personnel removing the offshore structures. These adverse impacts would be temporary and localized. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impact.</p> <p>With regard to water quality, alternative A would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and</p>	<p>Overall, this alternative would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative B would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Cultivated shellfish as filter feeders would remain in Drakes Estero under this alternative, offering localized long-term beneficial impacts on water quality by removing suspended solids, nutrients, and phytoplankton from the water column. Sediment disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity that would be mitigated by a floating silt screen. This alternative would include the replacement of between 1,700 and 2,500 posts in 2013 and between 380 and 750 posts in 2014 which also result in short-term adverse impacts on water quality as the sediment is disturbed. The use of pressure treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants</p>	<p>Overall, alternative C would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative C would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) but would not alter natural water quality conditions in the project area. Alternative C would have recurring but not long-lasting effects on water quality. Cultivated shellfish would remain in Drakes Estero for another 10 years under this alternative, offering localized beneficial water filtering functions from the removal of suspended solids, nutrients, and phytoplankton from the water column. Impacts on water quality would include those described under alternative B. In particular, sediment disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. This alternative would include the replacement of between 1,700 and 2,500 posts in year 2013 and between 380 and 750 posts in 2014, which would also result in short-term adverse impacts on water quality due to sediment disturbance. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants</p>	<p>Overall, alternative D would have short-term minor adverse as well long-term minor adverse impacts on water quality for 10 more years due to offshore and onshore activities associated with commercial shellfish operations in Drakes Estero. Alternative D would not be expected to exceed water quality standards, have long-lasting effects on water quality or impede the goals and objectives of NPS policies on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Alternative D would have the highest population of cultivated shellfish occupying Drakes Estero. As a result, the localized water quality benefits from filter feeding bivalves would be greater compared to the other alternatives. The impacts associated with alternative D would be similar to those described under alternatives B and C. However, this alternative may cause slightly higher rates of sediment disturbance in Drakes Estero compared to alternatives B and C due to more frequent boat trips and bag/tray management. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity, resulting in short-term minor adverse impacts on water quality.</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
<p>Action/Impact</p> <p>would be consistent with the purpose of the CWA, which is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."</p>	<p>Action/Impact</p> <p>would be employed as part of regulatory permit conditions. The point-source discharges (washing station and setting tanks) under this alternative would continue, but no new point-source outputs would be introduced. Point-source discharges would include water from the washing station after sediments and fouling organisms are filtered from the sediment basin resulting in beneficial impacts; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point-source pollution from runoff associated with the onshore facilities is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the cumulative impact.</p> <p>With regard to water quality, alternative B would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."</p>	<p>Action/Impact</p> <p>would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity, resulting in short-term adverse impacts on water quality. Standard BMPs would be employed during dredging such as the use of a floating silt screen. Point-source discharges would include discharging water from the washing station after marine sediments and fouling organisms are filtered and removed from the new sediment basin; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point source pollution from runoff at the onshore facility is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impacts.</p> <p>With regard to water quality, alternative C would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."</p>	<p>Action/Impact</p> <p>Standard BMPs, such as the use of a floating silt screen, would be employed during dredging. Onshore discharge into Drakes Estero of pumped water serving the washing station and setting tanks would be filtered using the new sediment basin, resulting in beneficial impacts on water quality. In addition, onshore sediment may enter waters due to the construction of new facilities, although this action could be mitigated through a site-specific construction plan and the use of standard BMPs. Alternative D also would result in short-term minor adverse impacts on water quality during the construction of new DBOC facilities because impacts would include temporary (lasting less than a year), localized impacts that would not have long-lasting effects on water quality. The cumulative impact would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.</p> <p>With regard to water quality, alternative D would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."</p>
Soundscapes			
<p>Alternative A would result in long-term beneficial impacts due to the elimination of human-caused noise levels associated with the commercial shellfish operation. The noise associated with the use of heavy machinery and motorized boats to remove DBOC structures and property would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet.</p>	<p>Overall, alternative B would result in long-term major adverse impacts on the natural soundscape from continued DBOC operations because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the time.</p>	<p>Overall, issuance of a 10-year SUP under alternative C would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered</p>	<p>Overall, issuance of a 10-year SUP under alternative D would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>However, this impact would interfere with the natural soundscape for less than 5 percent of one year; therefore, alternative A would result in short-term minor adverse impacts on soundscapes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative A would further the goals for soundscape management as set forth in relevant law and policy. NPS <i>Management Policies 2006</i> and <i>Director's Order 47: Soundscape Preservation and Noise Management</i> direct NPS managers to preserve and restore the natural soundscape, where possible.</p>	<p>Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative B would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative B would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative B would include continued impacts on the natural soundscape from DBOC activities. This aspect of Alternative B would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise far in excess of 60 dBA at 50 feet. In addition to DBOC trucks and processing station equipment, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for rare use by NPS for administration of the wilderness in accordance with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."</p>	<p>with more than 10 percent of the 10-year permit. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of the racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative C would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative C would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative C would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative C would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally by NPS for administration of the wilderness in accordance with a minimum requirements analysis).</p>	<p>with more than 10 percent of the time. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of onshore facilities as well as the repair and replacement of racks in Drakes Estero. Alternative D would also result in short-term major adverse impacts on the natural soundscape due to the use of heavy machinery during development of additional onshore facilities because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the year during which onshore construction would take place. The cumulative impact would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative D would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative D would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative D would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally by NPS for administration of the wilderness in accordance with a minimum requirements analysis).</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
		Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."	Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."
Wilderness			
<p>Overall, alternative A would result in long-term beneficial impacts on wilderness because the cessation of DBOC operations and removal of DBOC facilities would result in a readily apparent, widespread enhancement of wilderness character. The enhancement of wilderness character would be due to the removal of a commercial shellfish operation that detracts from wilderness character, including:</p> <ul style="list-style-type: none"> ▪ removal of nonnative shellfish cultivation (approximately 585,000 pounds in 2010); this equates to approximately 6 million oysters ▪ removal of human-made infrastructure associated with commercial shellfish operations, including 5 miles (7 acres) of racks and up to 88 acres of bottom bags in up to 142 acres of Drakes Estero ▪ discontinuation of motorboat operations, including use of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; and discontinuation of ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring as documented in the "Impacts on Eelgrass" section ▪ discontinuation of noise sources associated with commercial operation affecting wilderness 	<p>Overall, alternative B would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 600,000 pounds per year, otherwise expressed as approximately 7.06 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 5 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness) 	<p>Overall, alternative C would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 500,000 pounds per year, otherwise expressed as approximately 5.88 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness) 	<p>Overall, alternative D would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 850,000 pounds per year, otherwise expressed as approximately 10 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness)

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>Alternative A would also result in short-term minor adverse impacts on wilderness because activities related to the removal of racks would detract from offering outstanding opportunities for solitude in highly localized areas of the congressionally designated wilderness in Drakes Estero. The cumulative impact would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>Alternative A would enable NPS to fulfill its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d).</p>	<p>The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative B would prevent NPS from fulfilling its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation. However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to the existing commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.</p>	<p>The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative C would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.</p>	<p>The cumulative impact on wilderness would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impacts.</p> <p>Alternative D would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years. Collection of larvae is considered and analyzed as part of this alternative; however, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per <i>Management Policies 2006</i> (NPS 2006d), or regulations.</p>
Visitor Experience and Recreation			
<p>Overall, alternative A would result in a long-term beneficial or long-term minor adverse impact on visitor experience and recreation, depending on the interests of the visitor. From the perspective of</p>	<p>Overall, alternative B would result in short-term minor adverse impacts as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project area for</p>	<p>Overall, alternative C would result in short-term minor adverse and long-term minor adverse or long-term beneficial impact on visitor experience and recreation in the project area for an additional</p>	<p>As described above, alternative D would result in short-term moderate adverse as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>visitors seeking a natural park experience in Drakes Estero, alternative A would be beneficial because it would increase these opportunities. Alternative A would maintain visitor access to Drakes Estero, limiting access to recreational boaters only during the annual seal pupping season (March 1 to June 30). As described above, those looking to experience an active commercial shellfish operation would be adversely impacted by alternative A because they would no longer have this opportunity in the Seashore. The latter group of visitors composes up to 2.5 percent of the total visitors to the Seashore. Therefore, at a Seashore-wide scale, the adverse impacts associated with this alternative would affect a small portion of Seashore visitors. The cumulative impact would be long term and beneficial or long term, minor, and adverse, and alternative A would contribute an appreciable beneficial or noticeable adverse increment to the overall cumulative impacts.</p> <p>With respect to visitor experience and recreation, alternative A would be consistent with relevant law and policy because the removal of DBOC would not represent the loss of a visitor service. Visitor services are defined by law as public accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the Seashore (36 CFR 51.3).</p>	<p>an additional 10 years, depending on the interests of the visitor. Impacts from continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience in Drakes Estero, including those interested in experiencing solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music while working, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations would also detract from the natural environment. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative B to have a beneficial impact because DBOC would continue to offer experiences such as educational tours and services and fresh oysters to visitors. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative B would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact. In the short term, the repair and replacement of 50 racks in 2013 and another</p>	<p>10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. Specifically, from the perspective of those seeking a natural park experience in Drakes Estero, including those looking to experience solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of the resources for which the Seashore was established. DBOC operations would be generally unchanged under alternative C for an additional 10 years despite some modifications proposed to the existing facilities and production levels. The visitor experience and recreational opportunities at the site would be similar to current conditions, except that the existing, unpermitted picnic area, located adjacent to the retail area and away from the shoreline, would be removed and would be replaced by NPS with another picnic area nearby. Visual and sound disturbances associated with commercial shellfish operations would be apparent in the project area, although the associated impacts would be mostly limited to those visitors looking to enjoy a natural park experience in Drakes Estero. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. This debris also would continue to wash up on surrounding shorelines and beaches. In addition, motorized boats would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the</p>	<p>area for an additional 10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Similar to alternatives B and C, visual and sound disturbances associated with commercial shellfish operations could be readily apparent in the project area, and this impact would be particularly adverse for visitors seeking a natural park experience in Drakes Estero. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area, and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to use radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the natural environment. These adverse impacts would be greater than under alternatives B and C due to the increased production limits (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), which would likely increase motorized boat activity and the quantity of bags and other items associated with shellfish operations in Drakes Estero. Visitors to the</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.</p> <p>With respect to visitor experience and recreation, this alternative would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.</p>	<p>natural environment. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative C to have a beneficial impact because DBOC would continue to offer visitor experiences such as educational tours and services and fresh oysters. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative C would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.</p> <p>In the short term, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.</p> <p>With respect to visitor experience and recreation, alternative C would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.</p>	<p>Seashore who are interested in experiencing an active shellfish operation may consider alternative D to have a greater beneficial impact on visitor experience and recreation than the other alternatives because under this alternative the new facilities would enhance interpretation and educational opportunities at DBOC. However, in the short term, construction activities associated with alternative D could result in adverse impacts on visitor experience and recreation in Drakes Estero for both types of visitors. In particular, such activities could further disturb soundscapes and views in Drakes Estero and could temporarily limit interpretive and educational experiences at DBOC. In addition, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, also would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors. The cumulative impact on visitor experience and recreation would be long term, minor, and adverse or long term and beneficial, and alternative D would contribute a noticeable adverse and appreciable beneficial increment to the cumulative impact.</p> <p>With respect to visitor experience and recreation, alternative D would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
			not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.
Socioeconomic Resources			
<p>Overall, alternative A would result in long-term minor adverse impacts on local and regional socioeconomic resources. DBOC staff and their families would experience a direct adverse impact under alternative A due to the loss of jobs and housing. However, from a regional socioeconomic perspective, these impacts would be minimal and would not affect the overall regional economy. Based on employment, payroll, and revenue, DBOC accounts for 0.006 percent of the total value added in Marin County. DBOC staff composes 0.01 percent of the Marin County population and 2.1 percent of the Inverness population (U.S. Census Bureau 2010). Jobs lost in connection with the closure of DBOC make up only a small percentage of the total labor force for Marin and Sonoma counties and Inverness CDP, and even with the added job loss, assuming these jobs are not replaced by expanded shellfish operations elsewhere, unemployment rates in Marin County and Inverness CDP would be well below statewide averages of 12.4 percent (U.S. Department of Labor 2011). In addition, the relocated households encompass a small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.5 percent of the homes in Inverness CDP) (U.S. Census Bureau 2010). Therefore, even if all former staff relocates to another community and/or county, the impact on the regional economy would be minimal. Additionally, it is assumed that the Seashore, as a whole, would continue to contribute to the regional economy at current</p>	<p>Overall, alternative B would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially from current levels, and DBOC would continue to provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative B would contribute a noticeable beneficial increment to the cumulative impact.</p>	<p>Overall, alternative C would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially, and DBOC would provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative C would contribute a noticeable beneficial increment to the cumulative impact.</p>	<p>Overall, alternative D would result in long-term beneficial impacts on local and regional socioeconomic resources. Option 1 of alternative D would not change the availability of housing for DBOC staff and their families. In contrast, Option 2 of alternative D, which would include the elimination of four on-site housing units, would have an adverse direct impact on DBOC staff and the families that live on site.</p> <p>Under both options, DBOC would maintain its contributions to the regional economy in a manner similar to current conditions for an additional 10 years, with some exceptions; however, due to expanded opportunities for product diversification, these contributions could be slightly increased.</p> <p>The potential for increased shellfish production under alternative D could result in an increase in DBOC staff, providing additional jobs for local workers. Although the new facilities at DBOC could minimally increase visitation to the commercial shellfish operation, it is assumed that visitor spending associated with the Seashore as a whole would continue at current levels.</p> <p>The relocated households proposed under Option 2 represent a very small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.4 percent of the homes in Inverness CDP) (U.S. Census Bureau 2005-2009). Therefore, even if all DBOC staff who currently reside in on-</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>levels through local spending (approximately \$85 million in 2010) and by supporting jobs (resulted in \$12 million in added value to the region in 2010) (NPS 2011d). The cumulative impact on the local and regional economy would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.</p> <p>Alternative A could result in long-term major adverse impacts on California's shellfish market because DBOC produces 16 to 35 percent of the oysters harvested in California and 13 to 33 percent of the total shellfish grown in the state. The cessation of commercial shellfish operations in Drakes Estero would be readily apparent and could substantially influence the production of shellfish in California. The cumulative impact on the California shellfish market would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.</p>			<p>site housing move to another community and/or county, the impact on the local and regional economy would be minimal. Additionally, some short-term jobs would be created once new onshore facilities are approved by the NPS and developed by DBOC. The cumulative impact on the regional economy would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.</p> <p>Both Option 1 and Option 2 of alternative D would result in long-term beneficial impacts on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market for an additional 10 years. Additionally, the increased production limits proposed under this alternative would allow DBOC to cultivate more diverse and larger quantities of shellfish, including the purple-hinged rock scallop and the Olympia oyster, which are not currently produced at DBOC. These increased production limits could result in DBOC increasing its contribution to the California shellfish market. The cumulative impact on statewide shellfish production would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.</p>
NPS Operations			
<p>Overall, alternative A would result in long-term minor adverse impacts on NPS operations because impacts would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore. While existing NPS staff would be required for monitoring and enforcement during the Drakes Estero boat closure period, the installation of an access gate would increase</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP. In addition, two half-time (seasonal) positions would conduct monitoring and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness.</p>	<p>Overall, alternative C would result in a long-term minor adverse impact on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP and two part-time (seasonal) staff who would assess, monitor, and manage invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one dedicated FTE position to coordinate Seashore oversight and enforcement of all aspects of the SUP. The NPS would oversee and enforce all aspects of the operation in the permit area. Construction on new onshore facilities also would require one 2-year planning</p>

TABLE ES-4. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>effectiveness of the closure and further protect harbor seal pupping habitat. Two new part-time (seasonal) positions also would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These efforts would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>position to oversee additional planning and compliance associated with the proposed onshore development evaluated at the conceptual level in alternative D. The staff increase under alternative D also would include two half-time FTEs who would conduct assessment, monitoring, and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact on NPS operations would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.</p>

CONSULTATION AND COORDINATION

A combination of activities, including public scoping, formal public meetings, internal workshops, and agency briefings, has helped to guide NPS in developing the EIS.

SCOPING PROCESS AND PUBLIC PARTICIPATION

Scoping is a process that allows the agency to discuss the proposed action with stakeholders, interested and affected parties, and the public, as well as internally with agency personnel. To determine the scope of issues to be analyzed in depth in this EIS, internal meetings were conducted with Seashore staff, three public scoping meetings were held at different locations in the vicinity of the Seashore during the public scoping period, and relevant agency consultations were initiated.

Internal Scoping

An internal scoping meeting was held in September 2010 to initiate the EIS process and to define the initial scope of the EIS. Attendees included Seashore officials, DOI Solicitor's Office, representatives from NPS Pacific West Region, NPS Environmental Quality Division (EQD), and their contractors. Following the public and agency scoping period described below, the interdisciplinary planning team considered public comments for use in the development and refinement of project purpose and need, issues, impact topics, alternatives, and impact analysis for the EIS.

Public Scoping and Outreach

The public scoping period was open for a total of 50 days between October 8, 2010, and November 26, 2010. An NPS press release was published by Bay Area news outlets on October 5, 2010, announcing the dates, times, and places of the public scoping meetings. On October 8, 2010, NPS sent a scoping letter to more than 500 interested individuals and organizations notifying them of the opportunity to comment, and the NPS Planning, Environment, and Public Comment (PEPC) web-site was activated as a vehicle for the public to submit comments. The Federal Register published a Notice of Intent (NOI) to prepare an EIS on October 22, 2010 (NPS 2010d). The public comment period officially closed on November 26, 2010. More than 4,000 comment letters were submitted to NPS during the public comment period. On January 31, 2011, NPS posted the Public Comment Analysis Report and all public correspondence on-line at http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_scoping_comments.htm. Comments received during the public scoping process helped to inform the range of alternatives, as well as the impact topics to be addressed by the EIS. "Chapter 5: Consultation and Coordination" of this EIS provides more details about the public scoping activities, which were an integral part of the planning process for this EIS.

In April 2008, in conjunction with the SUP, DBOC and NPS agreed to a statement of principles (appendix C of the EIS) that outlined procedures to be followed in the event that a NEPA document need to be prepared for proposed activities associated with the remaining four-year term of the RUO. The statement of principles was executed prior to the enactment of section 124 and prior to the Secretary's decision to use the NEPA process to inform the decision on the possible issuance of a permit under section 124. NPS and DBOC have agreed to apply the statement of principles to this EIS to the extent that

it is applicable. In keeping with the statement of principles, NPS met with DBOC prior to the scoping process to discuss DBOC's interest in obtaining a permit under section 124 and to inform DBOC that NPS is initiating an EIS process and would be covering the cost for this new process. As indicated by the statement of principles, DBOC was to prepare a "description of their operations for NEPA evaluation" and that NPS would consider this description in developing the purpose and need for the NEPA document and alternatives to be considered. DBOC submitted scoping comments and other information regarding its operation during the initial scoping period and in subsequent requests through March 15, 2011. NPS fully considered DBOC's interests in developing the range of alternatives and impact topics that are addressed in this EIS.

The Draft EIS was made available for public review and comment beginning on September 23, 2011 and ending December 9, 2011. The document was made available for review electronically on the NPS PEPC web-site (www.parkplanning.gov/PORE) and in hard copy at park headquarters, local libraries, and at the public meetings. Hard copies or CDs also could be obtained by contacting the Seashore Superintendent. Three public meetings were held on October 18, 2011 (Point Reyes Station), October 19, 2011 (San Francisco), and October 20, 2011 (Mill Valley). During the 2011 public meetings, several informational posters were displayed to depict the project area, project purpose/need/objectives, the alternatives under consideration, and the resources potentially impacted by the alternatives. Attendees provided written comments during the meeting or had their comments transcribed onto flipcharts. Upon conclusion of the public comment period, all of the comments received at the meetings, entered directly into PEPC, provided via mail, or provided in person at the Seashore headquarters were entered and analyzed in PEPC. During the comment period, 52,473 pieces of correspondence were received, of which 50,040 were form letters (based on 24 distinct master form letters). A summary of public comments received and associated NPS responses are included in appendix F of the EIS.

Agency Scoping and Consultation

In addition to collecting comments from the public, NPS also initiated scoping with relevant agencies. Letters were sent out to notify the agencies of the intent to begin preparation of the EIS and to solicit agency comments and suggestions regarding the proposed project and its potential environmental effects on resources under their respective jurisdictions (appendix D). The agencies were asked to identify issues that should be analyzed in the EIS, determine the appropriate scope of the environmental analysis, identify potential management actions to be taken should the project commence, and determine whether agency permits or approvals would be required. Agency consultation is ongoing under the following laws and policies:

- Section 7 of the Endangered Species Act
- Magnuson-Stevens Act (essential fish habitat)
- Marine Mammal Protection Act
- Coastal Zone Management Act
- Section 106 of the National Historic Preservation Act
- Clean Water Act
- Rivers and Harbors Act
- Clean Air Act

- State Clearinghouse
- Tribal Consultation

Four agencies have entered into an agreement with NPS to be cooperating agencies in the development of the EIS: CDFG, USACE, NMFS, and the U.S. Environmental Protection Agency (EPA). Each of these cooperating agencies has special technical expertise related to the issues under consideration in the EIS. The cooperating agencies; tribal government; and several other federal, state, and local agencies were notified of the Draft EIS availability (see the complete “List of Recipients” in chapter 5 of the EIS).

In accordance with NEPA and section 309 of the Clean Air Act, the EPA reviewed the Draft EIS. In their response letter dated December 7, 2011, EPA rated the Draft EIS as “Lack of Objections (LO).” Formal comments on the Draft EIS also were received from NMFS (letter dated November 17, 2011, with clarification on December 9, 2011), USACE (letter dated December 8, 2011), CDFG (letter dated December 20, 2011), USCG (letter dated December 7, 2011), and CCC (letter dated December 12, 2011). Additional detail on agency scoping and consultation is included in chapter 5 of the EIS.

ENDNOTES

i. DBOC 2011f, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, March 4, 2011, regarding supplemental scoping information.

“Sales agreement between DBOC and JOC (including information on lease holding interests). Attached, please find a copy of the asset purchase agreement between Johnson Oyster Company and the Lunny Family (Attachment 1-A).”

ii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“Approximately 40% of DBOC income is from onsite retail sales, 40% is sold directly to local market and restaurants – all delivered by DBOC directly, 18% is sold to Tomales Bay shellfish growers, and 2% is sold through a wholesale seafood distributor based in San Francisco.”

iii. DBOC 2011i, Correspondence ID 52043, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit. Attachment: Comments on Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement Point Reyes National Seashore, prepared by ENVIRON International Corporation.

“All 22 workers at DBOC, who would lose their jobs if DBOC operates were cease, are of Hispanic or Latino ethnicity, and most also fall into the category of low-income.”

iv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC does not grow European flat oysters and does not plan to grow this species in the future.”

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACZA	ammoniacal copper zinc arsenate
ANSI	American National Standards Institute
BAAQMD	Bay Area Quality Management District
BMP	best management practices
CARB	California Air Resources Board
CCA	chromate copper arsenate
CCC	California Coastal Commission
CCCBR	Central California Coast Biosphere Reserve
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CDO	Cease and Desist Order
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFGC	California Fish and Game Commission
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
CSLC	California State Lands Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dBA	A-weighted decibel scale
DBOC	Drakes Bay Oyster Company
DO	Director's Order
DOE	Determination of Eligibility
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EQD	Environmental Quality Division (NPS)
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

FIGR	The Federated Indians of Graton Rancheria
FONSI	finding of no significant impact
FTA	Federal Transit Administration
FTE	full-time equivalent
GIS	geographic information system
GMP	general management plan
GPS	global positioning system
Harbor District	Humboldt Bay Harbor, Recreation, and Conservation District
IBA	Important Bird Area
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
JOC	Johnson Oyster Company
MBTA	Migratory Bird Treaty Act
MCDA	Marin County Department of Agriculture, Weights, and Measures
MIG	The Minnesota IMPLAN Group, Inc.
MLPA	Marine Life Protection Act
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MOU	memorandum of understanding
MPA	Marine Protected Area
MSX	multinucleated sphere unknown
MTC	Metropolitan Transportation Commission
NAS	National Academy of Sciences, National Research Council
National Register	National Register of Historic Places
NAVD-88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service (NOAA)
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOx	nitrogen oxides
NPCA	National Parks Conservation Association
NPS	National Park Service
NRC	National Research Council
NWP	Nationwide Permit
NWPS	National Wilderness Preservation System
OB	Oyster Bar
OCRM	Office of Ocean and Coastal Resource Management (NOAA)

Pb	lead
PCSGA	Pacific Coast Shellfish Growers Association
PEIR	Programmatic Environmental Impact Report
PEPC	Planning, Environment, and Public Comment web-site (NPS)
PFMC	Pacific Fishery Management Council
PL	Public Law
PM_{2.5}	particulate matter less than 2.5 micrometers
PRNSA	Point Reyes National Seashore Association
PSP	paralytic shellfish poison
PVC	polyvinylchloride
ROD	record of decision
ROG	reactive organic gas
RUO	reservation of use and occupancy
Seashore	Point Reyes National Seashore
Secretary section 124	Secretary of the Interior Section 124 of Public Law 111-88 of the Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010
SHPO	State Historic Preservation Officer
SOF	Statement of Findings
Solicitor's Office	U.S. Department of the Interior Solicitor's Office
SSC	special species of concern
SUP	special use permit
UEF	Upper Estero Far
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHB	Vanasse Hangen Brustlin, Inc.
VOCs	volatile organic compounds
Volpe	John A. Volpe National Transportation Systems Center

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An aerial photograph of a river delta system, likely the Ganges-Brahmaputra delta, showing a complex network of water channels and sandbars. The surrounding land is green and hilly. A large, bold black number '1' is overlaid in the upper right corner of the image.

1

PURPOSE OF AND NEED FOR ACTION

PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

This “Purpose of and Need for Action” chapter explains the intent of the Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP). DBOC currently conducts a commercial shellfish operation¹ in Drakes Estero, which is part of the Point Reyes National Seashore (the Seashore), located in Marin County, California (figures 1-1 and 1-2). DBOC operates within the Seashore pursuant to a reservation of use and occupancy (RUO) and a SUP. Both of these authorizations expire on November 30, 2012. The RUO and the SUP are included as appendix A of this EIS.

This EIS presents four alternatives. The no-action alternative considers expiration of existing authorizations and subsequent conversion of the area to congressionally designated wilderness. Three action alternatives consider the issuance of a new SUP to DBOC for a period of 10 years with differing levels of onshore facilities and infrastructure and offshore operations. Beneficial and adverse impacts are assessed for all four alternatives evaluated in this EIS. Existing authorizations for DBOC to operate expire November 30, 2012. The National Environmental Policy Act of 1969 (NEPA), as amended, process is being used to inform the decision of whether a new SUP should be issued. If a new SUP is issued, it would authorize DBOC to operate its onshore and offshore² operations until November 30, 2022. In the event that a new SUP is issued, it would incorporate all of DBOC’s National Park Service (NPS) authorized onshore and offshore operational requirements. There is no authority to issue or extend an RUO.

The authority for NPS to issue a new permit to DBOC came about as a result of congressional action. On October 30, 2009, Congress enacted section 124 of Public Law (PL) 111-88, which was part of the Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010 (appendix B). Section 124 states:

Prior to the expiration on November 30, 2012, of the Drake’s Bay Oyster Company’s Reservation of Use and Occupancy and associated special use permit (“existing authorization”) within Drakes Estero at Point Reyes National Seashore, notwithstanding

¹ Throughout this document, the terms “commercial shellfish operations,” “mariculture operations,” and “aquaculture operations” are used interchangeably.

² In this document, the term offshore is used to refer to operations and facilities in Drakes Estero, including waters, tide and submerged lands, and intertidal areas such as the shoreline and mudflats.

any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012: Provided, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. (Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010, Pub. L. No. 111-88, section 124, 123 Stat. 2904, 2932 [2009])

Section 124, as it will be referred to in this EIS, provides to the Secretary of the Interior (Secretary) the discretionary authority to issue a new SUP to DBOC for a period of 10 years. Congress granted the Secretary the discretionary authority contained in section 124 in response to NPS's determination that it lacked authority to allow DBOC to operate after November 30, 2012. PL 94-544 and PL 94-567 of 1976 designated Drakes Estero as potential wilderness. House Report 94-1680, which accompanied the public law, provided that, "it is the intention that those lands and waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status." The commercial shellfish operation in Drakes Estero, now operated by DBOC, is the only nonconforming use that prevents conversion of the waters of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness (appendix B). The discretionary authority contained in section 124 now allows the Secretary to permit DBOC's operations for a new 10 year term, until November 30, 2022.

Although the Secretary's authority under section 124 is "notwithstanding any other provision of law," the Department has determined that it is helpful to generally follow the procedures of NEPA. The EIS provides decision-makers with sufficient information on potential environmental impacts, within the context of law and policy, to make an informed decision on whether or not to issue a new SUP. In addition, the EIS process provides the public with an opportunity to provide input to the decision-makers on the topics covered by this document. The EIS examines four alternatives, described in "Chapter 2: Alternatives," which include both broad-scale and site-specific elements. In some instances, sufficient detail is available to analyze site-specific impacts without additional compliance evaluation under NEPA. In other cases, information is not available, or plans are insufficiently developed to allow detailed analysis. In the latter case, a conceptual level of analysis has been conducted. Those elements that would require further NEPA compliance are identified in "Chapter 2: Alternatives," within the detailed descriptions of each alternative (no-action and action alternatives).



-  Point Reyes National Seashore
-  Other Park Lands
-  County Boundaries
-  City/Town Boundaries
-  Hydrologic Features
-  Roads

North
 0 10 Miles

Source: ESRI Data & Maps (CD-ROM v. 9.3-2008) and Cal-Atlas Geospatial Clearinghouse Data

Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

**FIGURE 1-1
 Project Vicinity Map**



National Park Service
 U.S. Department of the Interior

Point Reyes National Seashore



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

**FIGURE 1-2
Project Location Map**



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

PURPOSE OF AND NEED FOR ACTION

DOI NEPA regulations, found at 43 CFR Part 46, address the formulation of purpose and need statements in NEPA documents that are prepared in response to permit applications. DOI NEPA regulations state that

When a bureau is asked to approve an application or permit, the bureau should consider the needs and goals of the parties involved in the application or permit as well as the public interest. The needs and goals of the parties involved in the application or permit may be described as background information. However, this description must not be confused with the bureau's purpose and need for action. It is the bureau's purpose and need for action that will determine the range of alternatives and provide a basis for the selection of an alternative in a decision. (43 CFR section 46.420)

PURPOSE AND NEED

Action is needed at this time because pursuant to section 124 of Public Law 111-88, the Secretary has the discretionary authority to issue a SUP for a period of 10 years to DBOC for its shellfish operation, which consists of commercial production, harvesting, processing, and sale of shellfish at Point Reyes National Seashore. The existing RUO and SUP held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing authorizations. Consistent with DOI NEPA regulations (43 CFR section 46.30), the proposed action for this EIS is the Secretary's decision whether to issue a permit under section 124.

The purpose of the document is to use the NEPA process to engage the public and evaluate the effects of issuing a SUP for the commercial shellfish operation. The NEPA process will be used to inform the decision of whether a new SUP should be issued to DBOC for a period of 10 years.

PROJECT OBJECTIVES

Project objectives build from the project purpose and identify those goals that are "critical to meet if NPS is to consider the proposal successful" (NPS 2001b). Project objectives should be grounded in the park's enabling legislation, purpose, significance, and mission goals; as well as relevant legislation; NPS plans (such as general management plans [GMPs]); or other NPS standards and guidelines. Project objectives should be broad enough to allow for a reasonable range of alternatives without narrowing the focus or intentionally excluding an alternative. The following project objectives have been identified:

- Manage natural and cultural resources to support their protection, restoration, and preservation.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
- Provide opportunities for visitor use and enjoyment of park resources.

DBOC GOALS

On July 6, 2010, DBOC submitted a request for the issuance of a new SUP upon expiration of the existing permit. Specifically, DBOC seeks to “occupy and utilize the buildings and lands on the shores of Drakes Estero” (Latham & Watkins, LLP 2010). DBOC requested that the EIS consider DBOC’s needs and goals, as the project applicant. DBOC requested that its objective of “operating an environmentally-friendly and sustainable oyster farm for a renewable 10-year period under a Service-issued SUP” be included both during scoping as well as during public review of the Draft EIS (DBOC 2010n, 2011i). DBOC also requested that the purpose and need be modified “to reference DBOC’s request that the renewed SUP be issued under [the] same terms and conditions present in the RUO/SUP, for permission to complete work authorized under the 1998 Environmental Assessment, and for permission to make select physical improvements.” DBOC suggested that language regarding discussion of mitigation measures and historical context be added to the purpose and need, as well (DBOC 2011i).

The goals provided by DBOC are included here as background information. DBOC’s goals have not been added to the NPS purpose, need, and objectives because doing so would limit the range of reasonable alternatives to only those that further DBOC’s goals, which may not reflect the broader public interest, and would be inconsistent with the Secretary’s discretion under section 124.

Specifically, DBOC’s goal that NPS issue a “renewable” SUP is not consistent with section 124, which authorizes only one, 10-year permit term. Similarly, DBOC’s goal that the new permit be limited to its onshore operations only is inconsistent with section 124, which specifies that a new permit must mirror the terms of the existing permit. DBOC’s existing SUP authorizes onshore and offshore operations, consistent with NPS’s jurisdiction over Drakes Estero. A new permit issued under section 124 would therefore authorize both onshore and offshore operations.

AUTHORITY OVER DRAKES ESTERO AND ADJACENT LANDS

A number of federal and state agencies have jurisdiction over activities taking place within the waters of Drakes Estero and on the uplands where the oyster processing facilities are located.

NPS JURISDICTION

DBOC’s operations occur on uplands adjacent to Drakes Estero and on tide and submerged lands within the Estero. All of the upland, tidal, and submerged lands on which DBOC conducts its operations are located within the Seashore and are owned in fee by the United States. The tide and submerged lands in Drakes Estero were conveyed by statute from the State of California to the United States in 1965. (Additional information about this conveyance is provided below.) In 1972, NPS purchased a five-acre upland tract from Johnson Oyster Company (JOC). JOC reserved a 40-year reservation of use and occupancy on 1.5 acres of the tract “for the purpose of processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation to the visiting public, and residential purposes reasonably incidental thereto” (NPS 1972a). Pursuant to 36 CFR section 1.2, activities occurring on lands and waters under the jurisdiction of NPS are subject to applicable NPS laws and regulations.

In April 2008, DBOC and NPS signed a SUP (NPS Permit No. MISC-8530-6000-8002) that covered all offshore areas and the remaining onshore areas of operation outside of the 1.5-acre RUO. DBOC's operations in the Seashore are governed by the terms and conditions of the RUO and the SUP. Both the RUO and SUP require DBOC to comply with applicable NPS laws, regulations, and policies. The RUO requires the holder of the RUO to “abide by all rules and regulations pertaining to National Park System areas” (NPS 1972a). The SUP, which applies to all offshore areas and all upland areas outside of the RUO area, expressly states that DBOC operations are subject to NPS regulation. The RUO and SUP are provided in appendix A.

As stated above, the state conveyed the tide and submerged lands in Drakes Estero to NPS in 1965. The statutory language provided that the State of California granted, “Subject to limitations that are described in Section 2, all of the right, title, and interest of the State of California . . . in and to all of the tide and submerged lands or other lands beneath navigable waters situated within the boundaries of the Point Reyes National Seashore” (chapter 983, section 1, Statutes of California, July 9, 1965). Under section 2 of the grant, the state reserved all rights to oil, gas, and other hydrocarbons with the further provision that no well or drilling operations were to be conducted on the surface (chapter 983, section 2, Statutes of California, July 9, 1965). In accordance with article 1, section 25 of the California Constitution, the statutory conveyance reserved “to the people of the state the right to fish in the waters underlying the lands [conveyed]” (chapter 983, section 3, Statutes of California, July 9, 1965). Upon review of the land conveyances made by the Office of the Surveyor General and the Legislature, the California State Lands Commission (CSLC) determined that the State had conveyed out all of the State’s real property interest except the mineral estate, leaving the CSLC with no jurisdiction over the bed of Drakes Estero (CSLC 2007ⁱ).

The NPS’s jurisdiction over DBOC’s aquaculture operation is not limited by the rights the state retained when it conveyed the tide and submerged lands in Drakes Estero to the United States. The California Department of Fish and Game (CDFG) and CSLC have concluded, and NPS agrees, that the “right to fish,” as retained by the state, does not extend to aquaculture, such as DBOC’s commercial operation (CDFG 2007bⁱⁱ; CSLC 2007ⁱⁱⁱ; DOI 2012a^{iv}). In official communications shortly after DBOC’s state water bottom lease was renewed, CDFG explained that “*fishing* involves take of public trust resources and is therefore distinct from aquaculture, which is an agricultural activity involving the cultivation and harvest of private property” (emphasis in original) (CDFG 2007b). Because the right to fish does not extend to aquaculture, CDFG concluded that NPS has primary management authority over DBOC operations (CDFG 2007b^v, 2008a^{vi}).

The basis for the CDFG opinion is confirmed by the California Fish and Game Code. The California Fish and Game Code distinguishes aquaculture and its products from public trust resources, such as wild fish, which are held in trust by the state and which do not belong to private individuals. The California Fish and Game Code defines “fish” as “*wild* fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof” (emphasis added) (California Fish and Game Code section 45). In contrast to the “wild” organisms included in the definition of “fish,” the California Fish and Game Code establishes that the products of an aquaculture operation are the private property of the operator of that facility. Under the California Fish and Game Code provisions on aquaculture, “the cultured progeny of wild plants and animals . . . are the exclusive property of that person who cultured them or that person’s successor in interest” (California Fish and Game Code section 15001). Further, “any person who takes aquaculture products without lawful entitlement is subject to prosecution for theft” (California Fish

and Game Code section 15002). Aquaculture products are private property and therefore cannot be part of a public fishery. Because the tide and submerged lands in Drakes Estero were conveyed to the United States without limitations as to the aquaculture operations, NPS laws, regulations, and policies apply to DBOC's operations on tide and submerged lands within Drakes Estero.

STATE MANAGEMENT OF AQUACULTURE OPERATIONS

State regulation of aquaculture operations by CDFG are addressed in Division 12 of the Fish and Game Code. Under these code provisions, CDFG regulates the stocking of aquatic organisms, brood stock acquisition, disease control, the importation of aquatic organisms into the state, and the transfer of organisms between water bodies. There are approximately 30 marine aquaculture operations within the state (CDFG [Ramey], pers. comm., 2011d). Some are located on state-owned tide and submerged lands while others are located on tide and submerged lands under the jurisdiction of other governmental entities or private parties. State management by CDFG of these operations differs based on the operation's location (e.g., granted tidelands, private tidelands, or state tidelands).

Under the Fish and Game Code, the State of California, through the Fish and Game Commission (CFGC), issues state water bottom leases for aquaculture operations that are located on state-owned tidelands. CDFG manages 16 shellfish leases held by 8 such operators (this does not include two leases to DBOC issued over granted tidelands in Drakes Estero) (CDFG 2011f^{vii}). Through these leases, CDFG collects payments from aquaculture operators. These payments include an annual lease fee based on the number of acres included in the lease and privilege use taxes, which are based on the gallons of oysters produced as reported by monthly statements. CDFG also has authority to regulate other aspects of these operations, including the stocking of aquatic organisms, brood stock acquisition, disease control, the importation of aquatic animals, and the transfer of organisms between water bodies. As discussed below, this authority pertains to all importers regardless of whether their operation is located on state-owned tidelands or on tidelands owned by other governmental entities or private parties.

There are approximately 19 other aquaculture operations (this does not include DBOC) in the state. Nine of these operations are on granted or private tidelands and the remaining 10 are land-based facilities (CDFG 2011f^{viii}). With the exception of Drakes Estero, the CFGC does not issue state water-bottom leases for aquaculture operations located on granted or private tidelands, and CDFG does not collect lease fees or privilege use taxes from these operators. Rather, these operators make payments to the entity that holds title to the tide and submerged lands on which they operate.

One example of the type of regulatory oversight that exists for aquaculture operations on granted tidelands is found with the Humboldt Bay Harbor, Recreation, and Conservation District (Harbor District), which was established in 1973 under the Humboldt Bay Harbor, Recreation and Conservation Act of 1970. Subsequently, the state of California granted all its tidelands and submerged lands to the Harbor District, reserving to the state "the right to fish in the waters on said lands with the right of convenient access to said water over said lands for said purpose." The Harbor District owns the tidelands upon which operations take place and the District, not CDFG, issues leases to the aquaculture businesses. The Harbor District collects lease payments (typically per acre) and a per gallon tax similar to the use tax collected by CDFG for CDFG-managed leases.

In the case of Drakes Estero, CFGC has issued, and CDFG administers, state water bottom leases to DBOC despite the fact that the underlying tidelands and submerged lands have been owned by the United States since 1965. CFGC issued the most recent lease in 2004. It is currently set to expire in 2029. The state water bottom lease is “contingent on a concurrent Federal Reservation of Use and Occupancy” (CDFG 2004d, 2004e). Even though the state lease explains that it is contingent on the RUO, the overlay of a state water-bottom lease on the federally owned tidelands and submerged lands in Drakes Estero has caused confusion, as evidenced by comments received during the public scoping process that sought clarification on the roles and responsibilities of NPS, the CFGC, and CDFG with respect to DBOC’s operation.

To address this confusion, NPS has consulted with CDFG, which is a cooperating agency for this EIS, throughout the process of preparing this EIS. NPS and CDFG agree that the right to fish does not authorize the state to issue water-bottom leases for aquaculture (CDFG 2007b^{ix}, 2008a^x; DOI 2012a^{xi}). Moreover, the 1965 conveyance divested the state of any real property interest in the tide and submerged lands in Drakes Estero except for certain mineral interests. The state therefore does not retain real property interest in the Estero sufficient for it to issue state water-bottom leases for aquaculture (CSLC 2007^{xii}; DOI 2012a^{xiii}). As a result, NPS, not CFGC, has the legal authority to determine whether DBOC may occupy water bottoms in Drakes Estero for its operation.

NPS and CDFG agree that should the Secretary issue a permit to DBOC under section 124, as a condition of receiving that permit, DBOC would be required to surrender its state water bottom lease to the CFGC prior to issuance of a new SUP by NPS. DBOC would thereafter operate under the terms of the NPS permit. NPS would include certain provisions from the state water bottom lease in the new SUP, such as that relating to the “Escrow Account for Cleanup of Aquaculture Leases.” This will ensure that certain provisions relating to DBOC operations that are currently incorporated into the SUP by reference remain in force. While it would no longer administer a state water bottom lease, CDFG would continue to exercise regulatory authority over DBOC. Thus, CDFG would regulate DBOC’s operation with respect to the stocking of aquatic organisms, brood stock acquisition, disease control, importation of aquatic organisms into the state, and the transfer of organisms between water bodies.

Under section 124, if the Secretary decides to issue a new 10-year permit to DBOC, DBOC must pay the United States the fair market value of the federal property permitted to DBOC. A permit under section 124 would encompass the federally owned onshore and offshore areas used by DBOC. By terminating the state water bottom lease, DBOC would avoid any obligation to make lease payments to the state.

OTHER JURISDICTIONS

Several other agencies have jurisdiction over activities taking place within the waters of Drakes Estero and on the uplands where the oyster processing facilities are located, including the California Coastal Commission (CCC); the San Francisco Bay Regional Water Quality Control Board; the California Department of Public Health (CDPH); the U.S. National Marine Fisheries Service (NMFS) Division of the National Oceanic and Atmospheric Administration (NOAA); the U.S. Army Corps of Engineers (USACE); and the U.S. Fish and Wildlife Service (USFWS). Specific agency jurisdictions and their applicability to this project are described in more detail in the “Related Laws, Policies, Plans, and Constraints” section of this chapter.

PROJECT AREA AND VICINITY

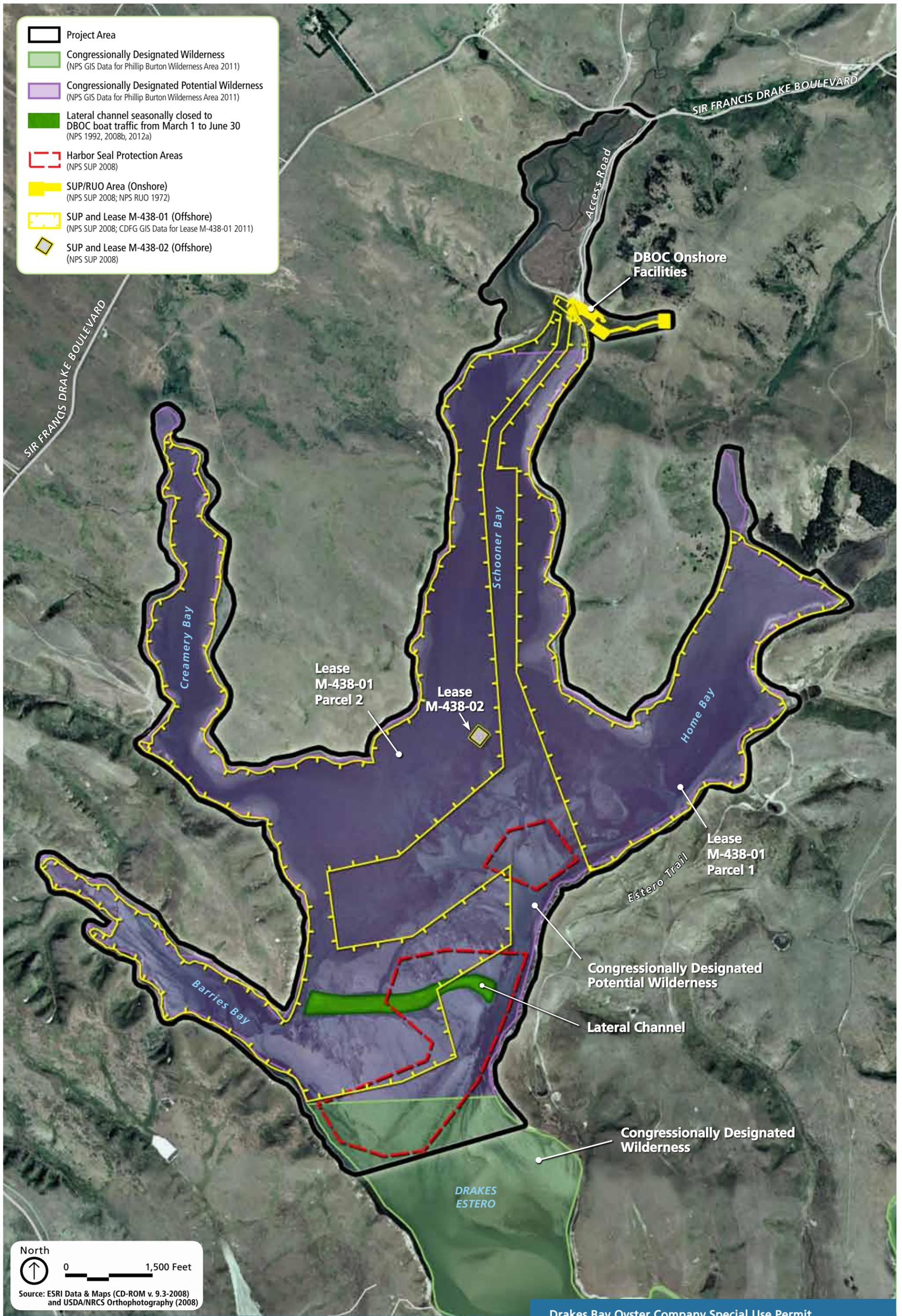
Point Reyes National Seashore, a landscape ranging from dramatic headlands and expansive sand beaches to open grasslands, brushy hillsides, and forested ridges, is located in western Marin County in central California, approximately 30 miles northwest of San Francisco. The Seashore is situated within 50 miles of the nine-county San Francisco Bay Area, the fifth largest metropolitan area in the United States (see figure 1-1). Western Marin County is primarily rural, with scattered, small, unincorporated towns that serve tourism, agriculture, and local residents. In addition, the Seashore also administers the Northern District of the Golden Gate National Recreation Area, adjacent to the Seashore, for a combined management area and legislated boundary of approximately 94,000 acres (see figure 1-2).

The Seashore is bounded to the north, west, and southwest by the Pacific Ocean and to the east by the residential communities of Inverness, Inverness Park, Point Reyes Station, Olema, and Dogtown. The town of Bolinas is south of the Seashore at the southern tip of the peninsula. The Seashore's boundary extends a quarter of a mile from the mean high tide (both in the Pacific Ocean and Tomales Bay), and includes the tidelands and submerged lands in this zone. The coastal resources within this marine habitat contribute to the biological diversity of the Seashore.

Drakes Estero is a system of five branching bays encompassing approximately 2,500 acres. The branching bays are stretched to the north and separated by low converging ridges. From west to east, they are: Barries Bay, Creamery Bay, Schooner Bay, Home Bay, and Estero de Limantour (see figures 1-2 and 1-3). Nearly half of the Estero's surface area consists of mud and sand flats that are exposed at low tide (Press 2005). Because of the shallow character of the bay, and its tendency to flush completely within a normal tidal cycle, currents in the main stem and secondary channels are relatively strong.

The Drakes Estero watershed covers approximately 31 square miles, including Drakes Estero itself (Baltan 2006). The Seashore leases most of the lands surrounding Drakes Estero for cattle grazing (approximately 14 square miles within the watershed). Areas draining to and surrounding the Estero de Limantour are primarily within congressionally designated wilderness (approximately 8 square miles within the watershed).

This EIS examines DBOC operations and facilities in and adjacent to Drakes Estero. The project area is roughly 1,700 acres and includes DBOC structures, facilities, and operations in much of the congressionally designated potential wilderness (1,363 acres), 2.6 acres of onshore property, and 2 acres incorporating the well and septic areas, as delineated in the RUO and SUP (see figures 1-3 and 1-4). In order to provide a comprehensive analysis of potential impacts of the alternatives presented in this EIS, the project area also includes the kayak launch parking area and the access road leading from Sir Francis Drake Boulevard. All land and water portions of the project area are owned by NPS. Resources outside the project area may be described if they are subject to impacts resulting from any of the proposed alternatives. The project area as a whole is depicted on figure 1-3, with figure 1-4 showing the detailed location of the onshore operations.



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 1-3
Project Area Boundary

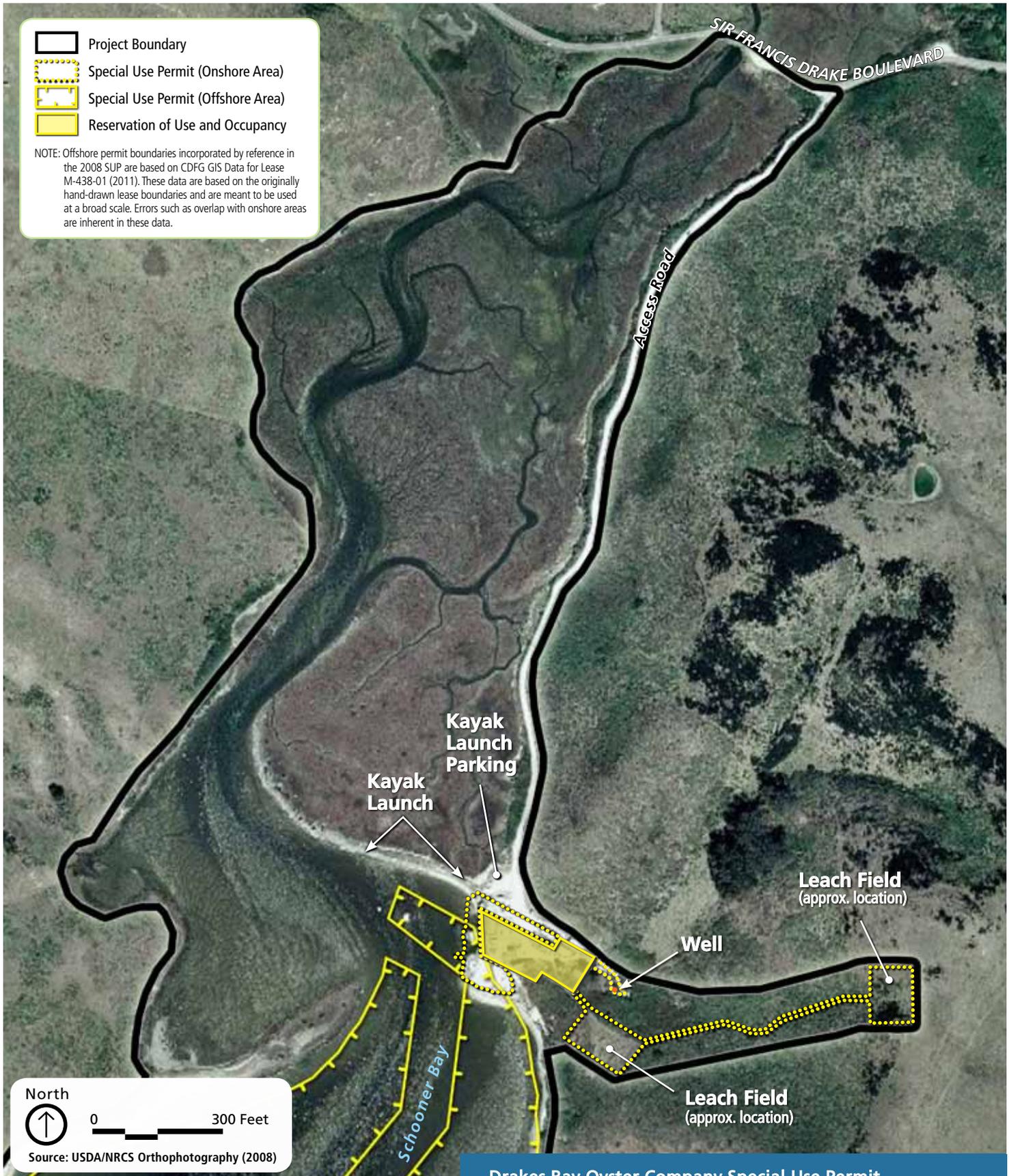


National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

-  Project Boundary
-  Special Use Permit (Onshore Area)
-  Special Use Permit (Offshore Area)
-  Reservation of Use and Occupancy

NOTE: Offshore permit boundaries incorporated by reference in the 2008 SUP are based on CDFG GIS Data for Lease M-438-01 (2011). These data are based on the originally hand-drawn lease boundaries and are meant to be used at a broad scale. Errors such as overlap with onshore areas are inherent in these data.



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 1-4
Project Area Boundary: DBOC Onshore Area of Operation

PURPOSE AND SIGNIFICANCE OF POINT REYES NATIONAL SEASHORE

The Seashore is located at a rich, complex convergence of land and sea, culture and nature, urban and rural. This is where continental and oceanic plates of the Earth's crust collide, creating the unique geological formations above (or atop) the San Andreas Fault. The Seashore's dynamic geologic foundations produce extraordinary biodiversity, where the rivers of the coastal range meet the sea, and where marine, estuarine, freshwater, and terrestrial ecosystems overlap. Human communities overlap here too: This is where European voyagers and the indigenous peoples of America's Pacific Coast are believed to have first encountered each other (Sadin 2007).

The Seashore lies within an area recognized locally, nationally, and globally as a center of biodiversity. The Seashore hosts more than 800 native plant species, over 490 resident and migratory bird species, anadromous fish, rare and elusive amphibians, and a unique assemblage of mammals such as bobcat (*Felis rufus*), elephant seal (*Mirounga angustirostris*), harbor seal (*Phoca vitulina*), mountain lion (*Puma concolor*), Point Reyes mountain beaver (*Aplodontia rufa*), and tule elk (*Cervus canadensis*). Drakes Estero is an exceptional nursery that provides abundant food, resting habitat, and shelter for a wide array of marine organisms and migratory waterbirds, including brant and North American species of pelicans. The northern California coast, including the Seashore, is part of one of the few major coastal upwelling regions in the world (Hill et al. 1998). The Seashore is one of the best locations on the West Coast to watch the migration of the Pacific gray whale and to observe other animals that live their lives in the open-ocean such as albatrosses, dolphins, and humpback whales.

Marine and land boundaries are shared with the Gulf of the Farallones National Marine Sanctuary, Golden Gate National Recreation Area, and Tomales Bay State Park. In 1988, the United Nations Educational, Scientific, and Cultural Organization Man in the Biosphere program designated the Central California Coast Biosphere Reserve (CCCBR) under the International Biosphere Program; CCCBR includes the entire Seashore, the Golden Gate National Recreation Area, and other public lands in the region. Four state designated "Areas of Special Biological Significance" are located within the Seashore: Bird Rock, Point Reyes Headlands, Double Point, and Duxbury Reef. In addition, the Phillip Burton Wilderness Area is unique in that it is the only wilderness area between Canada and Mexico that includes marine waters (wilderness.net 2011).

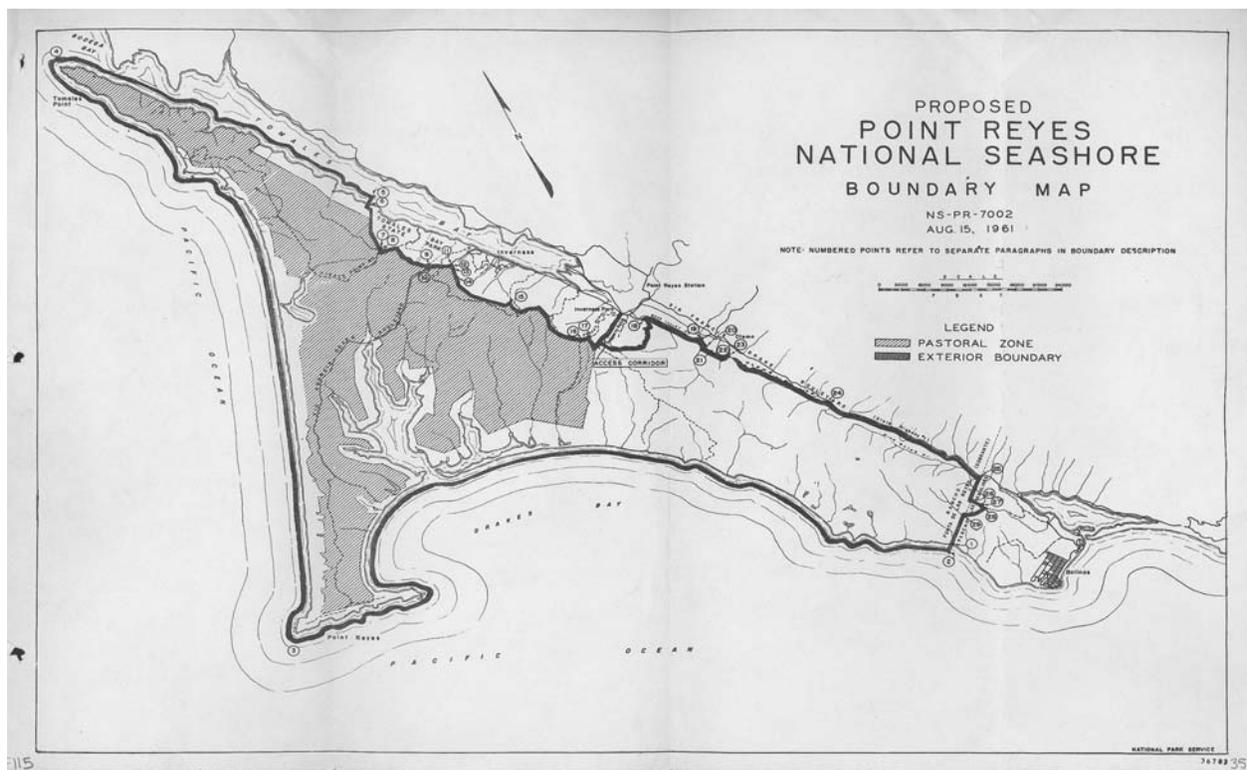
As set forth in the NPS Organic Act, the fundamental purpose of units of the national park system is "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (U.S.C. title 16, section 1 [16 U.S.C. 1]). Units of the national park system also generally have their own specific purposes set out in their legislation. In 1962, Congress established Point Reyes National Seashore "to save and preserve for the purposes of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped" (PL 87-657, section 1, September 13, 1962, 76 Stat. 538, codified at 16 U.S.C. 459c). President John F. Kennedy signed the Point Reyes Act (PL 87-657) into law on September 13, 1962 (appendix B).

With strong support and collective efforts from leaders working at the regional and national levels, as well as citizen activists, two bills were introduced to Congress in 1959 to seek authorization of a national

seashore on Point Reyes Peninsula. These bills, as constructed, did not advance fully, as local governments were concerned with issues such as loss of county tax revenue and infringement on the property rights of the ranchers and other landowners. As environmentalists, local managers, and ranchers began to realize that creation of the Seashore was the way to preserve and protect the conditions and livelihoods on the Point Reyes Peninsula from the forceful push of commercial land development, partnering began. In enacting the law establishing the Seashore, Congress considered both the cost of land acquisition and the fate of the existing dairy farms and cattle ranches within the potential boundaries. The enabling legislation specifically recognized the dairying and ranching operations by limiting the use of eminent domain within an area known as the “pastoral zone.” The pastoral zone was depicted on map number NS-PR-7002, dated August 15, 1961 (shown below).

Congress ratified this map by specifically referring to it in section 4 of the legislation, which states the following:

No parcel of more than five hundred acres within the zone of approximately twenty-six thousand acres depicted on map number NS-PR-7002, dated August 15, 1961 . . . shall be acquired without the consent of the owner so long as it remains in its natural state, or is used exclusively for ranching and dairying purposes including housing directly incident thereto. (PL 87-657, section 4, September 13, 1962, 76 Stat. 538)



Map NS-PR-7002, showing the pastoral zone of Point Reyes National Seashore. (Image courtesy of NPS.)

The section additionally defined “ranching and dairying purposes” as “such ranching and dairying, primarily for the production of food, as is presently practiced in the area” (PL 87-657, section 4, September 13, 1962, 76 Stat. 538). The administrative history of the Seashore identifies several rationales

behind the creation of the pastoral zone and the special treatment of ranching and dairying operations within the zone: responding to the concerns of ranchers, lessening the cost of initial land acquisitions, stabilizing the county's property tax base, and preventing commercial development within the area.

Despite the presence of JOC at the time of the deliberations, Drakes Estero and an upland buffer including the oyster operation were not identified as part of the pastoral zone depicted on map number NS-PR-7002. Thus, section 4 of the enabling legislation did not apply to the mariculture operations in and around Drakes Estero.

Although the enabling legislation did not specifically address the oyster operation, oyster operations were discussed in the 1962 legislative history. The House Report accompanying the legislation in 1962 mentions "small organizations engaged in oyster farming and fishing operations on Drakes Estero, Tomales Bay, and Point Reyes" (H. Rep. No. 87-1628, reprinted in 1962 U.S.C.C.A.N. 2500, 2504).

The report further notes that the committee had been advised that "none of these activities, as presently conducted, is incompatible with the plans of the National Park Service" and that there was an understanding with the owners of these properties that the government would have the first right to acquire the properties in the event the owners wished to dispose of them (H. Rep. No. 87-1628, reprinted in 1962 U.S.C.C.A.N. 2500, 2504).

In 1970, Congress removed section 4 from the legislation to address concerns around the eminent domain clause, through subsection 2b of the act of April 3, 1970 (PL 91-223, April 3, 1970, 84 Stat. 90), and in 1978 Congress added language authorizing the leasing of federally owned land that was agricultural land prior to its acquisition. Section 318(b) of PL 95-625 (1978) states the following:

Where appropriate in the discretion of the Secretary, he or she may lease federally owned land (or any interest therein) which has been acquired by the Secretary under this Act, and which was agricultural land prior to its acquisition. Such lease shall be subject to such restrictive covenants as may be necessary to carry out the purposes of this Act. Any land to be leased by the Secretary under this section shall be offered first for such lease to the person who owned such land or was a leaseholder thereon immediately before its acquisition by the United States. (PL 95-625, title III, section 318[b], November 10, 1978, 92 Stat. 3467, 3487, codified at 16 U.S.C. 459c-5[a])

Section 318(c) also defined "agricultural property" to mean "lands which were in regular use for, or were being converted to agricultural, ranching, or dairying purposes as of May 1, 1978, together with the residential and other structures related to the above uses of the property" (PL 95-625, title III, section 318[c], 92 Stat. 3487, codified as amended at 16 U.S.C. 459c-5[b]).

ESTABLISHMENT OF WILDERNESS AT POINT REYES NATIONAL SEASHORE

The National Wilderness Preservation System was established by Congress in 1964 to ensure that some lands of the United States would be preserved and protected in their natural condition for the permanent good of the people. Such federally owned areas are designated by Congress as "wilderness areas." An

area of wilderness is further defined as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation which is protected and managed so as to preserve its natural conditions” (16 U.S.C. 1132).

During the 1970s, NPS studied the Seashore, as directed by the Wilderness Act of 1964, to determine the suitability of designating areas of the Seashore as wilderness. In 1972, the Seashore published its initial recommendation for an area of about 5,150 acres for the purpose of preservation of wilderness areas (NPS 1972b). Recognizing the uniqueness of the resources on the Point Reyes Peninsula and the threats that ensuing commercial and land development posed to other surrounding lands, NPS recommended 10,600 acres be designated as wilderness (NPS 1974). Congress ultimately decided in 1976 to designate more than 33,000 acres as wilderness or potential wilderness, including 25,370 acres as wilderness and another 8,003 acres of land and water as potential wilderness (PL 94-544, October 18, 1976, 90 Stat. 2515 and PL 94-567, October 20, 1976, 90 Stat. 2695). While the legislative language clearly articulates acreage in section 1, the map filed with the committee, as required under section 2 of the legislation, calculated that the actual acreage of those lands and waters is 24,200 acres of wilderness and 8,530 acres of potential wilderness. The waters of Drakes Estero were included in the potential wilderness designations, but the upland areas used for shellfish processing operations were not. Potential wilderness additions are defined as lands that do not qualify for immediate designation as wilderness “due to temporary nonconforming or incompatible conditions” (NPS 2006d, section 6.2.2.1). The House Committee Report accompanying the wilderness bill states the following about the potential wilderness additions:

As is well established, it is the intention that those lands and waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status. (H. Rep. No. 94-1680, September 24, 1976)

PL 94-567 also provided an administrative mechanism for the conversion of potential wilderness to full wilderness once “all uses thereon prohibited by the Wilderness Act have ceased” (PL 94-567, section 3, October 20, 1976). In order for potential wilderness to be converted, NPS must publish a notice in the Federal Register that all nonconforming uses within the potential wilderness have ceased. Upon such publication, the congressionally designated potential wilderness gains congressionally designated wilderness status.

In addition to the wilderness provisions contained in PL 94-544 and 94-567, Congress amended the provisions of the Seashore enabling legislation by adding language elaborating on the original purposes of the Seashore. Rather than focusing on recreational or other aspects of the Seashore, Congress directed that the Seashore be administered “without impairment of its natural values, in a manner which provides for such recreational, educational, historic preservation, interpretation, and scientific research opportunities as are consistent with, based upon, and supportive of the maximum protection, restoration, and preservation of the natural environment within the area” (PL 94-544, section 4, October 18, 1976, 90 Stat. 2515, codified at 16 U.S.C. 459c-6; and PL 94-567, section 7, October 20, 1976, 90 Stat. 2695, codified at 16 U.S.C. 459c-6).

In February of 2004, the Department of the Interior, Office of the Solicitor issued a legal opinion regarding the meaning of the 1976 legislation designating Drakes Estero as potential wilderness. Based on

the language of the law and its legislative history, the opinion concluded that NPS was mandated to convert the potential wilderness in Drakes Estero to full wilderness as soon as the nonconforming use could be eliminated (DOI 2004). The oyster operation in Drakes Estero was dependent on the 40-year RUO that Charles Johnson had retained when he sold his 5-acre parcel to NPS in 1972. The RUO expires on November 30, 2012, making this date the earliest date on which the obstacle to full wilderness designation would cease. In October 2009, section 124 of PL 111-88 provided the Secretary discretionary authority to issue a new SUP for a period of 10 years notwithstanding the intent of the 1976 wilderness legislation.

COMMERCIAL SHELLFISH OPERATIONS IN DRAKES ESTERO

OVERVIEW FROM 1930 TO 2004

Mariculture developers first planted oyster beds in the Tomales Bay area around the turn of the 20th century. Throughout the 1930s, CDFG conducted successful experimentation with nonnative species to create commercial shellfish aquaculture in the state. In a 1935 survey to assess the suitability of California bays and inlets for commercial shellfish aquaculture, Bonnot stated regarding Drakes Estero: “No oysters were found growing there. Several small plants of Japanese seed oysters were made in 1932. The oysters grew remarkably well and in five months were about two-thirds market size. A project of an experimental nature on a much larger scale is now being promoted...” (Bonnot 1935). In a later report on the California oyster industry, Bonnot noted that Humboldt Bay began to establish artificial culture of the native oyster (*Ostrea lurida*), using the already existing natural beds. Research was conducted to determine the necessary biological conditions for this success of the native oyster in California (Bonnot 1937). Oyster growers, in an attempt to produce a faster- and larger-growing product, introduced nonnative species of oyster to several water bodies in California, including Drakes Estero. The success of the nonnative Pacific oyster (*Crassostrea gigas*) in Tomales Bay and Drakes Estero contributed to the establishment of new companies and the retooling of existing oyster businesses. In 1938, the original Drakes Bay Oyster Company (no relation to the present-day DBOC) built a small “opening” plant on the banks of Drakes Estero near the head of Creamery Bay, selling its freshly shucked oysters in San Francisco. The plant operated within Drakes Estero until 1945. The 5-acre plant property was not owned by the oyster company but was part of a larger estate (Caywood and Hagen 2011).

Due to World War II, Pacific oyster seed shipments ceased and oyster operations declined. This interruption, coupled with other factors, caused some oyster operations in the area to dissolve. In 1946, the Drakes Estero oyster allotment was transferred to Larry Jensen (Caywood and Hagen 2011). During the Jensen tenure, the ownership of the 5-acre parcel containing the processing plant was integrated with the state water allotment lease in Drakes Estero. In 1951 and 1952, both the nonnative Pacific and eastern oysters (*Ostrea virginica*) were grown within Drakes Estero by the original Drakes Bay Oyster Company (CDFG 2011c). In April 1954, Larry Jensen entered into an “agreement of sale” with Van Camp Seafood for his oysters, state oyster allotments, and the 5 acres of upland real property that accompanied the state water bottom leases. In turn, it was quickly transferred to the Coast Oyster Company (Caywood and Hagen 2011; CDFG 1954, 1955).

In 1958, Charles W. Johnson, a seed buyer for the Coast Oyster Company, settled in California and took over the oyster operation in Drakes Estero. He soon founded JOC. Charles Johnson cultured oysters in Drakes Estero and operated onshore processing facilities from 1961 through 2003. Johnson purchased 5 acres of onshore land where the existing processing facilities were located in 1961. He and his wife improved upon an L-shaped processing plant. A frame building used for opening oysters, a dock, and five small cottages or cabins were preexisting. By 1963, the Johnsons had built two additions to the processing plant, one serving as a sorting room and the other for restrooms, and expanded one of the cabins for their residence (Caywood and Hagen 2011).

Although the Seashore was established in 1962, NPS did not acquire ownership of all lands and waters within the Seashore's boundary immediately. In 1965, the state-held water bottoms of Drakes Estero were conveyed to NPS by the State of California. As of 1965, however, NPS did not own the upland areas where the oyster processing facilities were located. NPS purchased fee title to the 5-acre upland parcel from Johnson in 1972. As part of the purchase agreement, Johnson elected to retain a 40-year RUO over 1.5 acres of the 5-acre parcel. The RUO allowed for "processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation to the visiting public and residential purposes reasonably incidental thereto" (NPS 1972a).

Even though the water bottoms in Drakes Estero were conveyed to the United States in 1965, the state has continued to issue state water bottom leases for shellfish cultivation in Drakes Estero. The continued issuance of state water bottom leases has created confusion and is inconsistent with the NPS's ownership and jurisdiction over Drakes Estero. Should the Secretary issue a new permit to DBOC under section 124, as a condition of receiving that permit, DBOC would be required to surrender its state water bottom lease to the CFGC prior to issuance of a new SUP by NPS.

In 1979, the state consolidated Oyster Allotment Nos. 2 and 72 into one Mariculture Lease (M-438-01)³ in conformance with a new standard numbering system. Lease M-438-01 was described as two parcels (see figure 1-3): Parcel 1 contains 343 acres on the east side of Drakes Estero and Parcel 2 contains approximately 706 acres on the west side of Drakes Estero. A 1-acre parcel designated as Mariculture Lease M-438-02⁴ lies within Parcel 2. Parcels 1 and 2 contain approximately 1,049 acres⁵ and together compose Lease M-438-01 (see figure 1-3).

In 1979, Lease M-438-01 was allotted for the purpose of culturing Pacific oysters and European flat oysters (*Ostrea edulis*). The authorized methods of oyster cultivation in 1979 included bottom, rack, and stake cultures (CDFG 1979a). The 1-acre Lease M-438-02 was allotted for the sole purpose of culturing purple-hinged rock scallops (*Hinnites multirugosus*) (scallop) in accordance with provisions of section 6400 of the California Fish and Game Code. As permitted, scallops were to be confined and cultivated on racks and in trays. No other mode of operation or culture was authorized at the time (CDFG 1979b).

³ Referred to as Lease M-438-01 in remainder of document.

⁴ Referred to as Lease M-438-02 in remainder of document.

⁵ Since the consolidation of several allotments into Lease M-438-01 in 1979, the lease language has specified that the lease area is made up of two parcels totaling approximately 1,059 acres; however, the geographic information system (GIS) data provided by CDFG in 2011 for this lease area measures 1,049 acres. For the purposes of this EIS, all area calculations are based on GIS data. Therefore, the latter measurement is used to represent existing conditions throughout this EIS.

In August 1993, JOC made a request to CDFG to begin the culture of Manila clams (*Venerupis philippinarum*, also known as *Tapes japonica* and *Venerupis japonica*) in Lease M-438-01 (Studdert 1993^{xiv}). In an October 7, 1993, meeting, CFGC authorized JOC to cultivate Manila clams in an amendment to Lease M-438-02. The CFGC meeting minutes documenting the approval of the request state “Lease M-438-02 is a small, 1-acre lease which has been previously used by the JOC in experimental culture of species other than oysters. Johnson Oyster Company would now like to investigate if conditions in Drakes Estero are suitable for culture of Manila clams” (CFGC 1993). CDFG sent a letter to JOC confirming that Manila clams had been added to Lease M-438-02, and JOC signed the lease amendment.

In November 1989, the Marin County Planning Department contacted Charles Johnson regarding violations involving the enlargement of the processing plant and installation of mobile homes without appropriate permits. These activities were also inconsistent with the terms of the RUO. Failure to obtain a coastal development permit also placed JOC in violation of California Coastal Act provisions. However, to bring JOC into compliance with federal, state, and local codes and regulations, a number of facility replacements and best practices were still needed, including an upgrade to the septic system (Caywood and Hagen 2011). The expanded septic system plans were eventually submitted to NPS by JOC and evaluated for compliance as part of the 1998 Environmental Assessment (EA) which included several other activities, including removal of unpermitted mobile homes and construction of new facilities (NPS 1998a, 1998b). The EA and the executed finding of no significant impact (FONSI) included the existing building removal and new construction of a 900-square-foot garage, a 2,625-square-foot seed plant, a 500-square-foot stringing plant, and a 7,600-square-foot processing plant, along with a new septic system that would include a new leach field and rehabilitation of the existing leach field. The FONSI also included an annual processing/production limit of 700,000 pounds (oyster weight) to ensure that the new facilities would not create additional growth (and any new negative impacts) in overall oyster production in the estuary (NPS 1998b). The only actions that JOC completed were removal of some mobile homes from the site and installation of a single leach field, which corrected the unpermitted discharge.

While some progress was made by JOC in bringing facilities into compliance, there were still numerous California Coastal Act, county building code, and NPS permit violations left unresolved (Caywood and Hagen 2011). In 2003, CCC issued a Cease and Desist Order (CDO) (No. CCC-03-CD-12) to JOC that required the removal of some unpermitted development from the property (the shucking room and the retail counter, two houses, and two of the four mobile homes), improvement of the wastewater system (which was draining into Drakes Estero), remediation related to the storage of oyster cultivation equipment and disposal of refuse in Drakes Estero and along the shore, and the submittal of a coastal development permit application for after-the-fact authorization for other unpermitted development that included construction of several commercial buildings and a horse paddock; additions to pre-Coastal Act buildings; and permanent placement of a mobile home, three metal storage/refrigeration containers, and an aboveground diesel fuel tank and concrete containment structure (CCC 2003). In September 2003, due to the various unresolved violations, NPS revoked authority for the construction and replacement activities that had been authorized by the 1998 EA and FONSI (NPS 2003c^{xv}).

Prior to expiration of its 1979 leases, JOC requested lease extensions for a period of 25 years. In February 2004, a CDFG letter to JOC indicated that “the Department would require that a federal/National Park Service (NPS) lease be in effect concurrently with the state water bottom lease” (CDFG 2004a^{xvi}). On March 15, 2004, NPS conveyed legal opinions from the Solicitor’s Office regarding the JOC RUO and

relationship to wilderness to the CDFG Director (NPS 2004c^{xvii}). On June 14, 2004, CDFG provided their recommendation to the CFGC stating “The Department recommends approval of the requested lease renewals for a period of twenty-five years, contingent on there being a Federal Reservation for the land use within the Point Reyes National Seashore” (CDFG 2004b^{xviii}). On June 18, 2004, NPS sent a letter to CDFG reiterating that “The NPS still believes that any activity in the Estero must also be permitted by the NPS” (NPS 2004d^{xix}).

CFGC approved lease renewals to JOC on June 25, 2004, for both Lease M-438-01 and Lease M-438-02, for a 25-year period. This approval was contingent on a concurrent federal RUO for land in the Seashore. These renewals were for the express purpose of cultivating the Pacific and European flat oysters in the previously designated Lease M-438-01 and purple-hinged rock scallops and Manila clams in Lease M-438-02. A series of operational conditions accompany CDFG leases, including methods of cultivation, record keeping, requirements for requesting additional species, and requirements for providing a financial guarantee for cleanup (CDFG 2004d).

DRAKES BAY OYSTER COMPANY: 2005 TO PRESENT

In December 2004, DBOC purchased the assets of JOC, assuming the remaining seven years of the RUO and SUP that NPS had issued to JOC for the well and septic leach field (DBOC 2011f^{xx}). There were no changes to the terms of the RUO or to its expiration date. On March 18, 2005, CDFG authorized the transfer of Leases M-438-01 and M-438-02 from JOC to DBOC, which is owned and operated by Kevin and Nancy Lunny (CDFG 2005a, 2005b). The acreages and the shellfish culturing provisions of the leases remained the same. Lease M-438-01, for approximately 1,049 acres of water bottoms within Drakes Estero, allowed for the cultivation of Pacific oysters and European flat oysters, with minimum production limits placed on the oyster harvesting (CDFG 2005a). Lease M-438-02, which is the 1-acre parcel on the west side of Drakes Estero inside the boundary of Lease M-438-01, allowed for the cultivation of purple-hinged rock scallops and Manila clams (CDFG 2005b).

When DBOC purchased the assets of JOC, it also assumed the compliance obligations arising from the CCC Consent Cease and Desist Order issued to JOC (CCC 2003). DBOC has worked with CCC staff to remove some of the unpermitted developments, including the removal of the western portion and the second-floor addition to the processing plant and retail facility, two storage containers, a refrigerated trailer, the seed setting area, the western portion of the storage facility, and a mobile home. However, not all of the unpermitted development had been removed when DBOC completed additional development without a coastal development permit or approval from NPS, including placement of two large containers for shucking/packing/storage and a temporary construction trailer, construction of a processing facility and second leach field, grading and paving within the onshore portions, and placement of oyster culture apparatus in Drakes Estero (CCC 2007b). DBOC also established unauthorized practices on the property (e.g., boat transit outside established channels). CCC and NPS alerted DBOC to the violations, and DBOC agreed to submit a coastal development permit application for all “onshore and offshore” development on the property that required a permit. A second Consent Cease and Desist Order (No. CCC-07-CD-11/CCC-07-CD-04) was issued as a short-term order to allow DBOC operations to continue while DBOC met the remaining requirements for documented violations. The 2007 Cease and Desist Order set time frames for submittal of the coastal development permit application, established agreed-upon conditions of the operations, and identified activities to be avoided until CCC received and approved the

application. The consent order furthermore directed DBOC to take actions and implement protective measures to ensure protection of coastal resources. On November 29, 2007, DBOC signed the consent order to work with CCC and NPS to resolve the violations (CCC 2007b). Even though the 2007 Cease and Desist Order was issued as a short-term order, it currently remains in effect.

In April 2008, DBOC and NPS signed a SUP (NPS Permit No. MISC-8530-6000-8002) that would allow the commercial shellfish operation in Drakes Estero to remain, with provisions, until November 30, 2012, when it expires concurrently with the RUO. The SUP outlines the terms and conditions that apply to DBOC operations, including limits on the amount of shellfish that may be cultivated, limits on the types of facilities that may be constructed, and various measures designed to protect Seashore resources, modeled after mitigation measures defined in CCC Consent Cease and Desist Order (CCC 2007b). The SUP area includes the 1.1 acres of lands and improvements adjacent to the RUO (see figure 1-4) and the waters corresponding to Leases M-438-01 and M-438-02 (see figure 1-3). Additionally, the existing well site and septic field that support the onshore oyster operations were included in the permit. Consistent with the RUO, the SUP was issued to allow for the cultivating, processing, and selling of oysters, as well as the interpretation of oyster cultivation. The conditions and special terms of both the RUO and the SUP can be viewed in appendix A. The issuance of the 2008 SUP did not result in the retroactive approval of facilities and operations that had not been previously approved by NPS, as the 2008 SUP cover page indicates that NEPA compliance was “pending.” NPS and DBOC agreed, through the signing of the SUP, that NPS would prepare a NEPA analysis presenting alternative operating scenarios for DBOC’s operations through November 30, 2012. Before NPS could fully initiate the NEPA document for the 2008 SUP, Congress enacted section 124. Therefore, this EIS is now the vehicle in which NPS is considering different operating scenarios for DBOC.

CDFG leases transferred to DBOC following its purchase of JOC, allowed cultivation of the Pacific oyster, European flat oyster, purple-hinged rock scallop, and Manila clam. The purple-hinged rock scallop and Manila clam were listed as approved species on Lease M-438-02 (CDFG 2005b). Although not approved, JOC also had Kumamoto oysters (*Crassostrea sikamea*) under cultivation. JOC did not report Kumamoto or European flat oysters separately, so the bulk of the reported harvest levels were recorded as the Pacific oyster. While included in Lease M-438-01, there is no record that DBOC has ever produced European flat oysters. DBOC identified and removed the Kumamoto oysters under direct CDFG supervision (DBOC 2008c^{xxi}; CDFG 2008b^{xxii}). Small numbers of scallops were harvested by the Johnsons in Lease M-438-02. Tax reports do not indicate harvesting of any scallops to date by DBOC.

While CFGC authorized Manila clams within Lease M-438-02 beginning in 1993, there is no record in the annual Proof of Use Reports of tax records of Manila clam harvest. The cultivation of Manila clams within Lease M-438-01 has not been approved by NPS as required by section 4(b)(vi) of the 2008 SUP (NPS 2008b). In spring 2009, DBOC advised CDFG that it believed the 1993 CFGC decision to add Manila clams to Lease M-438-02 was a clerical error, and DBOC requested that Manila clams be added to its Lease M-438-01. In a letter dated December 8, 2009, NPS expressed concerns to the CFGC regarding the expansion of Manila clams within the Seashore’s boundary. Specifically, NPS was concerned about the size of the expansion and lack of environmental review or analysis of risk, the potential for establishment of a nonnative species, and the potential to add substrate for the highly invasive nonnative tunicate, *Didemnum vexillum* (NPS 2009d^{xxiii}). On December 10, 2009, CFGC authorized amendment of Lease M-438-01 to include the cultivation of Manila clams, calling it a clerical error (CFGC 2009^{xxiv}). In a letter on December 22, 2009, NPS advised DBOC that additional information was required before NPS

could determine whether to give final approval under the SUP, and that cultivation of clams on the larger lease could only occur subsequent to such approval (NPS 2009e^{xxv}). DBOC declined to offer any additional information in its response to NPS (DBOC 2009c^{xxvi}). The addition of Manila clam cultivation to the area of Lease M-438-01 and outside the boundaries of Lease M-438-02 is not authorized under the NPS SUP.

During the time CDFG and CFGC were reviewing the request for Manila clams in Lease M-438-01, CCC issued DBOC an enforcement notice on September 16, 2009, stating that DBOC was out of compliance with the 2007 Consent Cease and Desist Order because Manila clams were located outside Lease M-438-02 (CCC 2009b^{xxvii}). In response to the CCC notice, DBOC agreed to move the Manila clams from Lease M-438-01 to Lease M-438-02. In early December 2009, NPS and CCC issued letters of violation to DBOC for placement of Manila clam bags within one of the harbor seal exclusion areas (NPS 2009c^{xxviii}; CCC 2009a^{xxix}). In response, DBOC stated that clam bags had been placed within a harbor seal protection area because its global positioning system (GPS) coordinates were misread and the misplaced clams would be immediately removed (DBOC 2009a^{xxx}).

From 2009 to 2011, DBOC submitted several requests to CCC, CDFG, and/or NPS for improvements and alterations to the commercial shellfish operation (DBOC 2009b^{xxxi}, 2010f^{xxxii}, 2010m^{xxxiii}, 2010n^{xxxiv}, 2011c^{xxxv}, 2011e^{xxxvi}, 2011g^{xxxvii}). On March 30, 2010, CCC forwarded the DBOC proposals to NPS and requested a review of the list of proposed actions that were currently authorized under the DBOC SUP (CCC 2010a^{xxxviii}). Although some of the actions proposed in the development plans were authorized by the existing SUP, NPS was not able to fully evaluate the proposed development actions because supporting information such as design plans and other relevant data was not submitted. Several site drawings and development costs have been subsequently provided by DBOC, including an emergency storm damage replacement request in March 2011 (DBOC 2011a^{xxxix}, 2011b^{xl}). These, along with recent requests for a lease boundary adjustment and an updated site plan, are considered as requests under article 6 of the SUP (NPS 2008b). NPS has reviewed these requests, and many of the requests are considered as elements of alternatives presented in this EIS (see “Chapter 2: Alternatives”).

On September 29, 2011, CCC notified DBOC regarding potential noncompliance with several of the stipulations in the 2007 Consent Cease and Desist Order: “1) marine debris in Drakes Estero and on nearby coastal beaches, especially from abandoned, discarded, or fugitive plastic aquaculture materials; and 2) motorized vessel transit in the lateral sandbar channel near the mouth of the Estero during the seasonal restriction period established for harbor seal pupping sites in this area” (CCC 2011). CCC reaffirmed these continued violations and requested additional information from and meetings with DBOC in a subsequent letter on February 1, 2012 (CCC 2012a^{xli}).

On February 17, 2012, DBOC submitted an updated coastal development permit application to CCC for review and approval (DBOC 2012a^{xliii}). CCC informed DBOC on March 16, 2012 that this coastal development permit application was “incomplete because there is no evidence of landowner approval of the proposed work, a portion of the permit fee has not been submitted, and you [DBOC] have not provided sufficient detail regarding the additional work” (CCC 2012d). DBOC informed NPS in a letter dated May 7, 2012 that it would limit its current coastal development permit application to existing activities and would apply to CCC for a coastal development permit amendment in the future prior to future development (DBOC 2012c^{xliiii}). On June 5, 2012, DBOC responded to the NPS’s previous request

for additional information related to consistency with the SUP and provided an updated project description (DBOC 2012b^{xliiv}).

In a letter dated July 30, 2012, CCC informed DBOC of its continued noncompliance with several of the stipulations in the 2007 Consent Cease and Desist Order, including unauthorized boat use of the lateral channel during the seasonal closure for harbor seal pupping, unauthorized boat use of the lateral channel to obtain water sampling data, the collection and disposal of marine debris as a result of JOC and DBOC operations, and development within the coastal zone without an approved coastal development permit. CCC noted that DBOC's May 7, 2012 letter to NPS, "discusses development activities that DBOC has pursued without benefit of a CDP" and; therefore, CCC reiterated that "any development in the coastal zone portion of Point Reyes National Seashore requires a CDP from the Commission unless otherwise exempt from permit requirements" (CCC 2012b^{xlv}). CCC also notified DBOC that a new Cease and Desist Order is being considered, "Considering the current uncertainty of a new lease and SUP permit being granted to DBOC, the delays in the various proceedings, your [DBOC] apparent confusion over certain terms of the Order, and the continuing difficulties in bringing DBOC operations into compliance with the Coastal Act" (CCC 2012b). On October 24, 2012, CCC notified DBOC that CCC was commencing proceedings for issuance of cease and desist and restoration orders (CCC 2012e^{xlvi}). The letter summarized the violation as follows:

Unpermitted development including but not limited to: operation of offshore aquaculture facilities; construction/installation of structures and the performance of ongoing harvesting, processing, sales, and other operations; and violations of Consent Cease and Desist Order No. CCC-07-CD-11 (Drakes Bay Oyster Company) including installation of additional unpermitted development, boat traffic in the lateral sand bar channel near the mouth of the Estero during a seasonal restriction established for harbor seal pupping sites, and discharge of marine debris in the form of abandoned, discarded, or fugitive aquaculture materials. (CCC 2012e)

THE NEPA PROCESS

NEPA was passed by Congress in 1969 to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that could significantly affect it. Environmental reviews under NEPA involve integration of social, environmental, and economic factors within the framework of existing laws, regulations, policies, and agency guidance for project decisions. Although the Secretary's authority under section 124 is "notwithstanding any other provisions of law," the Department has determined that it is helpful to generally follow the procedures of NEPA. The requirements of NEPA as implemented by the Council on Environmental Quality (CEQ), as well as NPS regulations and guidance for NEPA implementation and decision-making (Director's Order 12 and Handbook: *Conservation Planning, Environmental Impact Analysis, and Decision-making* [DO-12]) (NPS 2001b), will therefore guide this environmental review process.

SCOPING PROCESS AND PUBLIC PARTICIPATION

Scoping is a process that allows the agency to discuss the proposed action with stakeholders, interested and affected parties, and the public, as well as internally with agency personnel. To determine the scope of issues to be analyzed in depth in this EIS, internal meetings were conducted with Seashore staff, three public scoping meetings were held at different locations in the vicinity of the Seashore during the public scoping period, and relevant agency consultations were initiated.

Internal Scoping

An internal scoping meeting was held in September 2010 to initiate the EIS process and to define the initial scope of the EIS. Attendees included Seashore officials, DOI Solicitor's Office, representatives from NPS Pacific West Region, NPS Environmental Quality Division (EQD), and their contractors. Following the public and agency scoping period described below, the interdisciplinary planning team considered public comments for use in the development and refinement of project purpose and need, issues, impact topics, alternatives, and impact analysis for the EIS.

Public Scoping and Outreach

The public scoping period was open for a total of 50 days between October 8, 2010, and November 26, 2010. An NPS press release was published by Bay Area news outlets on October 5, 2010, announcing the dates, times, and places of the public scoping meetings. On October 8, 2010, NPS sent a scoping letter to more than 500 interested individuals and organizations notifying them of the opportunity to comment, and the NPS Planning, Environment, and Public Comment (PEPC) web-site was activated as a vehicle for the public to submit comments. The Federal Register published a Notice of Intent (NOI) to prepare an EIS on October 22, 2010 (NPS 2010d). The public comment period officially closed on November 26, 2010. More than 4,000 comment letters were submitted to NPS during the public comment period. On January 31, 2011, NPS posted the Public Comment Analysis Report and all public correspondence on-line at http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_scoping_comments.htm. Comments received during the public scoping process helped to inform the range of alternatives, as well as the impact topics to be addressed by the EIS. "Chapter 5: Consultation and Coordination" of this EIS provides more details about the public scoping activities, which were an integral part of the planning process for this EIS.

In April 2008, in conjunction with the SUP, DBOC and NPS agreed to a statement of principles (appendix C) that outlined procedures to be followed in the event that a NEPA document need to be prepared for proposed activities associated with the remaining four-year term of the RUO. The statement of principles was executed prior to the enactment of section 124 and prior to the Secretary's decision to use the NEPA process to inform the decision on the possible issuance of a permit under section 124. NPS and DBOC have agreed to apply the statement of principles to this EIS to the extent that it is applicable. In keeping with the statement of principles, NPS met with DBOC prior to the scoping process to discuss DBOC's interest in obtaining a permit under section 124 and to inform DBOC that NPS is initiating an EIS process and would be covering the cost for this new process. As indicated by the statement of principles, DBOC was to prepare a "description of their operations for NEPA evaluation" and that NPS would consider this description in developing the purpose and need for the NEPA document and

alternatives to be considered. DBOC submitted scoping comments and other information regarding its operation during the initial scoping period and in subsequent requests through March 15, 2011. NPS fully considered DBOC's interests in developing the range of alternatives and impact topics that are addressed in this EIS.

The Draft EIS was made available for public review and comment beginning on September 23, 2011 and ending December 9, 2011. The document was made available for review electronically on the NPS PEPC web-site (www.parkplanning.gov/PORE) and in hard copy at park headquarters, local libraries, and at the public meetings. Hard copies or CDs also could be obtained by contacting the Seashore Superintendent. Three public meetings were held on October 18, 2011 (Point Reyes Station), October 19, 2011 (San Francisco), and October 20, 2011 (Mill Valley). During the 2011 public meetings, several informational posters were displayed to depict the project area, project purpose/need/objectives, the alternatives under consideration, and the resources potentially impacted by the alternatives. Attendees provided written comments during the meeting or had their comments transcribed onto flipcharts. Upon conclusion of the public comment period, all of the comments received at the meetings, entered directly into PEPC, provided via mail, or provided in person at the Seashore headquarters were entered and analyzed in PEPC. During the comment period, 52,473 pieces of correspondence were received, of which 50,040 were form letters (based on 24 distinct master form letters). A summary of public comments received and associated NPS responses are included in appendix F.

Agency Scoping and Consultation

In addition to collecting comments from the public, NPS also initiated scoping with relevant agencies. Letters were sent out to notify the agencies of the intent to begin preparation of the EIS and to solicit agency comments and suggestions regarding the proposed project and its potential environmental effects on resources under their respective jurisdictions (appendix D). The agencies were asked to identify issues that should be analyzed in the EIS, determine the appropriate scope of the environmental analysis, identify potential management actions to be taken should the project commence, and determine whether agency permits or approvals would be required. Four agencies have entered into an agreement with NPS to be cooperating agencies in the development of the EIS: CDFG, USACE, NMFS, and the U.S. Environmental Protection Agency (EPA). Each of these cooperating agencies has special technical expertise related to the issues under consideration in the EIS. The cooperating agencies; tribal government; and several other federal, state, and local agencies were notified of the Draft EIS availability (see the complete "List of Recipients" in chapter 5).

In accordance with NEPA and section 309 of the Clean Air Act, the EPA reviewed the Draft EIS. In their response letter dated December 7, 2011, EPA rated the Draft EIS as "Lack of Objections (LO)." Formal comments on the Draft EIS also were received from NMFS (letter dated November 17, 2011, with clarification on December 9, 2011), USACE (letter dated December 8, 2011), CDFG (letter dated December 20, 2011), USCG (letter dated December 7, 2011), and CCC (letter dated December 12, 2011).

Chapter 5 of this EIS provides more detail about agency consultation and coordination and cooperating agencies.

REFERENCES USED FOR IMPACT ANALYSIS

As part of the NEPA evaluation process, this EIS uses various sources of information in the analysis of impacts. Primary references are those for which evidentiary support is traceable to a source that complies with recognized standards for data documentation and scientific inquiry. For example, data pertaining directly to the activities and conditions within Drakes Estero were obtained from NPS documents and other sources that have been prepared consistent with NPS standards for scientific and scholarly activities, including relevant peer review. For research conducted in similar settings (but not in Drakes Estero itself), references were taken from peer-reviewed scientific literature. Primary references were directly incorporated into this analysis where such references added clarity to the issues addressed. Secondary references are those for which evidentiary support is not directly traceable to a source that complies with recognized standards for data documentation and scientific inquiry. Secondary references can include documents that have not been subjected to peer review or that do not reflect direct on-site observations or measurements in accordance with a standard protocol for data documentation. Examples of secondary references include presentation slides, field notes, and personal correspondence. This includes some of the information provided by CDFG, DBOC, and members of the public.

A main resource used in development of this EIS is the NPS-commissioned National Research Council (NRC) of the National Academy of Sciences (NAS) report, *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* (NAS 2009). As stated in the report, the objective was to review scientific evidence at the following levels of inquiry: (1) scientific studies directly related to the impact of oyster mariculture on Drakes Estero, (2) other research on Drakes Estero, (3) research in similar ecosystems, and (4) the compendium of scientific research on bivalve mariculture in coastal estuarine environments from which general conclusions could be drawn. The 2009 NAS report is referred to in section 124, where it is stated that “the Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization.” The report provides an intensive review of pertinent scientific literature on this subject. As such, there is much overlap between the literature cited in that document and the references used to support this EIS. Furthermore, the conclusions drawn from the 2009 NAS report are taken into consideration (described under “Independent Reviews of the Information and Data Used in this EIS”).

Additional references beyond those used in the NAS report were considered in the EIS process in order to meet NEPA requirements, which are broader than the research objectives of the NAS report. In addition, since the time of the 2009 NAS report additional research regarding the resources considered in this EIS in similar settings, as well as in Drakes Estero itself, has become available. This research has been considered in this analysis where appropriate. The use of reference materials was also informed by the various reviews of the EIS discussed in the following section. Because the reference material is derived from various sources, relevant documentation was classified into two categories—primary references and secondary references—based on the authority of the sources, as explained above. In general, secondary references were not used for the analysis, unless there was a compelling reason to do so.

By following the above procedures for reviewing and selecting reference material, this EIS is in compliance with the Department of the Interior Departmental Manual part 305, chapter 3, “Integrity of Scientific and Scholarly Activities” (DOI 2011). In particular, this EIS “document[s] the scientific and scholarly findings considered in the decision-making and ensure[s] public access to that information and

supporting data through established Departmental and Bureau procedures—except for information and data that are restricted from disclosure under procedures in accordance with statute, regulation, Executive Order, or Presidential Memorandum” (DOI 2011). Because agency and DBOC correspondence is not readily available to the public, these items are endnoted throughout the EIS, except in instances where a direct quote is provided in the text.

Questions have been raised about the use of the following four references in this EIS: Anima 1990, Anima 1991, Harbin-Ireland 2004, and Wechsler 2004. The NPS has acknowledged that these four references were inappropriately cited in a previous NPS document. The fact that these references were inappropriately cited in a prior NPS document does not affect the integrity of the four references themselves. Each of the four references has been peer reviewed, and each remains a legitimate source for informing the analysis in this EIS. Harbin-Ireland 2004 and Wechsler 2004 are graduate theses that meet the peer review standards, although no subsequent journal articles related to these theses have been published. Wechsler 2004 is described as a preliminary study, and the recent NAS review determined that elements of the study’s methodology and data analysis constrain some EIS interpretations (NAS 2012a). NPS acknowledges the NAS assessment of Wechsler 2004; however, the issues addressed by NAS in 2012 do not affect the fundamental data recorded in the Wechsler study and used in the EIS. These references meet the criteria for primary reference works described above. So that readers of this EIS can readily understand the specific information from these references that informed the NEPA analysis, where they are used, these references have been endnoted as well, except in instances where a direct quote is provided in the text.

INDEPENDENT REVIEWS OF THE INFORMATION AND DATA USED IN THIS EIS

There have been a number of independent reviews of the science cited by the NPS in this EIS. The results of these reviews have been made public. The NPS has considered the findings of each of these reviews during the preparation of the Draft or Final EIS (depending on the release date of the review) and has modified the analysis in the EIS as appropriate.

Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, National Academy of Sciences

As noted above, a principal resource in the preparation of the EIS is the NPS-commissioned NAS report, *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* (NAS 2009). The report provides an intensive review of pertinent scientific literature on this subject. As such, there is much overlap between the literature cited in that document and the references used to support this EIS. Furthermore, the conclusions drawn from the 2009 NAS report are taken into consideration and cited where relevant within the EIS. In reflecting on the body of available science, the 2009 NAS report summarizes on page 6 that: “After evaluating the limited scientific literature on Drakes Estero and the relevant research from other areas, the committee concludes that there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero at the current (2008–2009) levels of production and under current (2008–2009) operational practices. . . .” Production levels for 2008–2009 representing the current levels of production referenced by NAS are approximately

450,000 lbs of shellfish, with Manila clams permitted only within the 1-acre Lease M-438-02. The 2009 NAS report does not provide a definition or detection threshold for what a “major” adverse ecological effect would be in this context, nor does it indicate that the NAS use of an impact qualifier (e.g., “major”) is consistent with NEPA standards. It should also be noted that archeological and historical sources that pertain directly to the presence or absence of oysters in Drakes Estero prior to the establishment of an oyster operation in the 1930s were not considered in the NAS study. The information provided by those studies may have a bearing on the decisions to be made.

The 2009 NAS report concludes:

Our committee concludes that this decision on extension of the RUO hinges on the legal interpretation of the legislative mandate rather than a scientific analysis of the impacts of DBOC on the Drakes Estero ecosystem. As such, more scientific study of DBOC operations and Drakes Estero would not necessarily affect National Park Service decisions about the future of oyster farming in the estero. (NAS 2009)

Should the Secretary use his discretionary authority to allow the oyster operation to remain until 2022, the new authorization would be an SUP under section 124. The RUO would not be extended.

Mariculture and Harbor Seals in Drakes Estero, California, Marine Mammal Commission

In July 2009, the Marine Mammal Commission (MMC) initiated a review of the potential effects of human activities, including aquaculture operations, on harbor seals in Drakes Estero. The study was concluded in 2011, and the results of this review are provided in the MMC report, *Mariculture and Harbor Seals in Drakes Estero, California* (2011b). The MMC pursued one primary line of inquiry into the issue of potential human effects on natural habitat in Drakes Estero: whether mariculture operations are adversely affecting harbor seals and, if so, to what extent. To accomplish this, the MMC analyzed available sources of data on the issue, including seal counts and disturbance records from NPS staff and volunteers, photographs, oyster production records, seal mortality observations, and aerial images. In addition, the MMC reviewed the validity of scientific publications that specifically address harbor seals in Drakes Estero, namely, Becker, Press, and Allen (2011). In summarizing the results of the study, MMC (2011b) describes several data gaps and recommends research and management activities to reduce the level of uncertainty surrounding this issue. With respect to sources of information derived from NPS records and research, the MMC provided the following interpretations: (1) due to the variability of seal count data, NPS records by themselves are not sufficient to determine factors that caused changes in seal numbers; (2) statistical procedures used in NPS publications [particularly Becker, Press, and Allen (2011)] were generally appropriate but could be improved; and, (3) Becker, Press, and Allen (2011) provides “...some support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated. However, the data and analyses are not sufficient to demonstrate a causal relationship” (MMC 2011b). As a component of their review, MMC (2011b) conducted some additional statistical analyses based on recommendations from an independent statistician. This included consideration of other potential influences on seals such as environmental conditions and the impacts of an aggressive seal at a nearby colony outside of Drakes Estero. After reviewing the results of these additional analyses, the MMC concluded that their results “...continue to

support the hypothesis that oyster harvest...is at least correlated with seal use of the different haul-out sites within Drakes Estero” (MMC 2011b). A more detailed discussion of the results of the MMC analysis is provided in chapter 4, “Impacts on Wildlife and Wildlife Habitat: Harbor Seals, Methodology.” These results are also used within the impact analyses for each alternative in the “Impacts on Wildlife and Wildlife Habitat: Harbor Seals” section.

Final Report on Peer Review of the Science Used in the National Park Service’s Draft Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit, Atkins

In March 2012, as requested by DOI, Atkins North America (Atkins), an independent consulting firm specializing in peer reviews, completed a peer review of “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences” of the Draft EIS to “examine the scientific and technical information and scholarly analysis presented in the document and assess whether: (1) appropriate scientific information was used; (2) reasonable conclusions were drawn from the information; (3) significant information was omitted from consideration; and (4) NPS interpretation of the information is reasonable” (Atkins 2012a). The review focused on marine estuarine ecology and coastal zone management (wetlands, eelgrass, benthic fauna, birds, special-status species), water quality, soundscapes, and socioeconomic resources. Overall, “the reviewers found the analyses to be appropriate, and that there is no fundamental flaw with the larger scientific underpinnings of the DEIS. The identified scientific misinterpretations, or lack of citation of appropriate literature are for the most part minor, and can be rectified if the NPS so wishes. This may also include making some additional adjustments to interpretation, and explicit acknowledgement of the lack of information on some key issues” (Atkins 2012a).

Based on the recommendations of the Atkins review, the Final EIS incorporates additional relevant references to all impact topics, as appropriate. As suggested by Atkins, text has been clarified where appropriate to better represent independent findings and link citations to each reference used. Direct comments from individual reviewers on the Atkins team have not been added to the text of the Final EIS or cited directly, as these comments are recommendations only.

The most critical finding of the Atkins review concerned the topic of socioeconomic resources. Atkins found that the “methods used [in the Draft EIS] to conduct an economic assessment of policy options do not follow accepted economic impact analysis practice” (Atkins 2012a). To enhance the socioeconomic resources sections (Affected Environment and Environmental Consequences), the Final EIS includes a more quantitative analysis of socioeconomic impacts using IMPLAN modeling, a relevant and industry-recognized method for assessing economic impacts. It should be noted that DBOC has requested all financial data related to the shellfish operation be kept confidential (DBOC 2012b^{xlvii}). Therefore, the revised socioeconomic resources section does not disclose specific revenue data.

Due to the high level of public interest in the soundscapes section of the Draft EIS and the results of the Atkins review of this impact topic, which found that “there is ample acoustic scientific evidence by which the DEIS can determine that DBOC noise-generating activities have negative impacts on both the human visitor experience and the seashore’s wildlife” (Atkins 2012a), the DOI submitted a letter to Atkins to forward public comments on the Draft EIS provided by Environ International Corporation (as attached to DBOC’s public comment letter, DBOC 2011i, and hereafter referenced as Environ 2011). The DOI letter

also asked the soundscapes reviewer to “clarify his views on the DEIS acoustics chapter so that the National Park Service (NPS) clearly understands his suggestions for improving it” (DOI 2012b^{xlviii}).

In response, Atkins provided the requested clarification and noted that “the new data made available by DBOC and ENVIRON during the DEIS comment period provide additional value to the impact assessment process and could usefully be included in the National Park Service’s Final EIS. However Dr. Clark [the Atkins soundscape reviewer], does mention that a full evaluation of these new data (and indeed the situation at Drakes Bay in general) would require new measurements and analysis over an extended period of time. As it stands, Dr. Clark’s original opinion regarding the conclusions he drew of the current DEIS is unchanged” (Atkins 2012b). Therefore, to supplement the soundscapes section in the Final EIS, the data collected onsite by Environ International Corporation has been included in the existing conditions and analysis of impacts. Because Environ did not follow pertinent standards and because the measurement processes and the operating conditions of the equipment were not adequately described⁶, the Environ measurements were compared with reports that document noise levels measured under specified conditions from comparable equipment.

Scientific Review of the Draft Environmental Impact Statement: Drakes Bay Oyster Company Special Use Permit, National Research Council, National Academy of Sciences

A second review was conducted by the NAS. This review occurred as a result of direction from Congress in a committee report accompanying a fiscal year 2012 appropriations act. Congress directed the NAS “to assess the data, analysis, and conclusions in the DEIS in order to ensure there is a solid scientific foundation for the Final Environmental Impact Statement.” Specifically, the NAS was provided with the following statement of task:

... assess the scientific information, analysis, and conclusions presented in the DEIS for Drakes Bay Oyster Company Special Use Permit, and; evaluate whether the peer review of the DEIS conducted by Atkins, North America for the U.S. Department of the Interior, is fundamentally sound and materially sufficient. The committee did not perform an independent evaluation of the environmental impacts of the proposed alternatives, but restricts its findings to the strength of the scientific conclusions reached in the DEIS and to the identification of concerns, if any, not covered in the Atkins peer review. The report focuses on eight of eleven resource categories considered in the DEIS: wetlands, eelgrass, wildlife and wildlife habitat, special-status species, coastal flood zones, soundscapes, water quality, and socioeconomic resources. (NAS 2012a)

The NAS released the results of this review on August 30, 2012 in draft form (“pre-publication”), and the final report was released on September 27, 2012. The NPS provided comments on the pre-publication version released in August, correcting factual errors related to NPS guidelines and suggesting clarifications to the water quality section (NPS 2012c).

⁶ NPS requested clarifying information regarding the Environ measurements from DBOC in a letter dated April 6, 2012. Clarifying information was provided to NPS in DBOC’s June 5, 2012 letter. This information was reviewed; however, it did not adequately describe measurement processes and descriptions of operating conditions.

In general, the NAS found that “there is not an extensive scientific literature on Drakes Estero and research on the potential impacts of shellfish mariculture on the Drakes Estero ecosystem is even sparser. Therefore, the NPS had little primary data on which to base the DEIS and had to rely to a large extent on inference from research conducted in other areas. Although this was the only approach that could be used under the circumstances, it not only made it difficult to differentiate impacts of alternatives B, C, and D, it resulted in a moderate to high level of uncertainty associated with conclusions concerning levels of impact for most of the resource categories reviewed by the committee.” The NAS commented that the use of “two different baselines in assessing the impacts of the no action and action alternatives” also contributed to the level of uncertainty in evaluating the impacts and providing a comparison among alternatives (NAS 2012a). In order to reduce the level of uncertainty in the impact analysis conclusions, the NAS recommended the following items for considering in revising the Draft EIS:

- Re-define levels of impact intensity using criteria that clearly distinguish levels of impact (negligible, minor, moderate and major) that are comparable across levels (e.g., direct and indirect impacts; impacts at individual, population and community levels of organization).
- Qualify each impact intensity conclusion in terms of levels of uncertainty such as those used by the committee.
- Clearly identify and explain all assumptions made in reaching conclusions concerning impact intensities.
- Describe potential alternate conclusions as appropriate.
- Segregate impact assessments for alternative A from alternatives B, C, and D and indicate that the assessments are not comparable due to use of different baselines.
- Use all relevant and available information, especially for water quality and soundscapes, such as additional measurements reported in Volpe (2011); analyze sound levels based on both dBA and unweighted values across a wide frequency range; and consider duty cycles when estimating the fraction of time DBOC activities impact the soundscape.
- Additional mitigation options could be included as possible permit conditions for the action alternatives to reduce impacts, e.g., an option to cease the culture of Manila clams would address some concerns about the establishment of that non-indigenous species in Drakes Estero; impacts of many DBOC practices (i.e., boat use, culture species and techniques, marine debris, soundscape effects) could potentially be reduced by the implementation of appropriate mitigation measures.
- Assess impacts associated with the potential establishment of non-indigenous species as a separate category.
- Provide greater consideration of the potential influence of climate change on DBOC operations and their associated impacts, e.g., rising sea level over the next 10 years could influence the spatial extent of inundation, potentially impacting resource categories such as vegetated tidal wetlands and the coastal flood zone; geographic ranges of warm water marine species are already extending poleward), a trend that could exacerbate problems associated with invasive non-indigenous species, including increasing the potential for establishment of reproductive populations of the nonnative Pacific oyster in Drakes Estero. (NAS 2012a)

The NPS response to each of these recommendations is included in appendix G.

Similar to the Atkins peer review, the NAS also made specific recommendations for improving the use of scientific information to inform the impact analyses. For each resource topic addressed by the NAS report, the NAS reviewed the quality of the information used and the analysis of that information and identified information gaps, where appropriate; made a determination of the reasonableness of the conclusions, assessed the level of uncertainty in making the conclusions, and suggested alternate conclusions; and suggested ways to reduce the level of uncertainty within the analysis. Based on this review, additional references have been reviewed and incorporated into the Final EIS, where applicable. Direct comments and critiques from the NAS committee are generally not cited in the text of the Final EIS. As with any other peer review, comments and critiques have been considered and changes have been made where appropriate. In addition, the general methodology for impact analyses has been revised to clarify how each alternative is assessed and how the conclusions are determined; and to define the area of analysis and the analysis period. The specific methodologies for each impact topic have been updated to clearly indicate what data is used in assessing impacts, where that data came from (research on Drakes Estero or other similar ecosystems), and what data is lacking. The intensity definitions for each impact topic also have been revised to use consistent language and clarify the area affected.

The NAS committee also evaluated whether the Atkins report was “fundamentally sound and materially sufficient” (NAS 2012a). NAS found that the “reviewers selected by Atkins are well-qualified;” however, the experts were “insufficient to address all of the scientific topics covered” by the Draft EIS. More specifically, the NAS committee “felt that additional expertise in water quality, wildlife (e.g., harbor seals, fish), and terrestrial soundscapes would be needed to provide a thorough peer review.” Due to the “limited range of expertise of the reviewers and the constraints placed on the review (limited to DEIS chapters 3 and 4, did not include the intensity definitions or conclusions),” the NAS committee did not consider the Atkins report to be “fundamentally sound and materially sufficient.”

USGS Photographic Review

Between spring 2007 and spring 2010 more than 250,000 digital photographs were taken from remotely deployed cameras overlooking harbor seal haul-out areas in Drakes Estero. The photographs were taken at one minute intervals. In December 2010, these photographs were posted on the NPS web site at http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_videos.htm. Because the photographs were not collected using documented protocols and did not meet Departmental standards for a scientific product, the NPS did not rely on the photographs in the Draft EIS. Public comments on the Draft EIS requested that the NPS reconsider whether these photographs were useful in evaluating disturbances to harbor seals. In response to these comments, the NPS initiated a third-party review of the photographs with the U.S. Geological Survey (USGS), in consultation with a harbor seal specialist with the Hubbs-Sea World Research Institute. The USGS issued a report entitled, *Assessment of Photographs from Drakes Estero Wildlife Monitoring Cameras* (Lellis et al. 2012).

The USGS assessment focused on the 2008 harbor seal pupping season, when more than 165,000 photographs were collected from two sites overlooking Drakes Estero between March 14, 2008 and June 23, 2008. The USGS identified a series of limitations to the utility of the photographs, including lack of study design, poor photograph quality, inadequate field of view, incomplete estuary coverage, camera obstructions, and weather.

The USGS concluded that generally the camera focus was too poor and image resolution too low to allow for accurate counts or aging of seals, or to provide enough anatomical detail to quantify postures associated with increased vigilance (e.g., head alerts or other alert behavior). Evaluation of the photographs stitched together into time-lapse videos did allow for documentation of gross disturbance events (e.g., flushing to water or flushing to new areas of the sand bar). The USGS developed time-lapse videos for each camera, each day with the 2008 photographs (191 videos including 103 for Upper Estero Far [UEF] and 88 for Oyster Bar [OB]). The USGS determined that for the approximately 100,000 UEF images, seals could not be discerned due to the low resolution and wide field of view. As a result, the USGS concluded that further evaluation of photographs or videos focused on UEF was unwarranted. The USGS did identify that detailed analysis of the photographs in time-lapse sequence overlooking the OB site could be used to understand seal use of the OB site related to time, tide, and weather, and some coarse detection of disturbance as measured by flushing of seals from resting positions towards or into the water. However, the USGS assessment does not document time, tide, and weather.

The USGS identified 73 instances from the OB videos where human or other unusual stimuli could be identified in the photographs at the same time as seals were hauled out on the sandbars. The USGS assessment identified 10 flushing disturbance events at the OB site in 2008. As noted, due to the poor quality, no other level of disturbance, such as increased vigilance could be detected from the photographs or videos. The USGS assessment attributed a specific stimulus to 6 of the 10 observed flushing disturbance events. Two flushing disturbance events were attributed to boat traffic at nearby sand bars, two were attributed to a kayak using the lateral channel (note kayak was in Drakes Estero in violation of seasonal closure), and two appeared to be related to seabirds landing among the seals. Based on the USGS assessment, the NPS has incorporated some discussion of sources of gross flushing events into chapter 4. Because of quality and study design issues, the photographs are not amenable to use for other types of disturbance such as increased vigilance or alerts.

ISSUES AND IMPACT TOPICS

Issues and Impact Topics Retained for Further Analysis

This EIS analyzes the effects of the actions proposed herein on relevant resources in the context of the laws and policies that apply to NPS management of these resources. Many resources and activities have the potential to be affected by either issuing or not issuing a SUP for continued commercial shellfish operations within the Seashore. These resources were initially identified by NPS staff during internal scoping and were further refined through the public and agency scoping process. Impact topics retained for detailed analysis within this EIS include wetlands and other waters of the U.S., eelgrass, wildlife and wildlife habitat, special-status species - California coast Coho salmon (*Oncorhynchus kisutch*) and central California coast steelhead (*O. mykiss*), coastal flood zones, water quality, soundscapes, wilderness, visitor experience and recreation, socioeconomic resources, and NPS operations. The following text discusses issues/considerations that form the basis for the content in “Chapter 3: Affected Environment,” and the impact topics and detailed analysis presented in “Chapter 4: Environmental Consequences.”

Wetlands and Other Waters of the U.S. The identification of wetlands within the project area is necessary to ensure their protection in accordance with federal laws (section 404 of the Clean Water Act [CWA] and the Rivers and Harbors Act of 1899) and state laws (e.g., the California Coastal Act of 1976). NPS *Management Policies 2006* states that NPS will implement a “no net loss of wetlands” policy and will (1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands (NPS 2006d). Guidance related to the management of wetlands is further clarified by Director’s Order 77-1: *Wetland Protection* (DO-77-1) (NPS 2002a). As defined by USACE and USFWS, wetland areas and other waters of the U.S. exist in the project area, both within Drakes Estero and along the shoreline where natural conditions persist. DBOC operations may have the potential to impact these wetlands through placement of materials (such as bags and trays) directly in wetlands, trampling of vegetated wetlands, and shading associated with racks, as well as people walking across mudflats, and propellers and boat hulls scraping the mud bottom. The impact topic of wetlands and other waters of the U.S. is retained for detailed analysis in this EIS.

Eelgrass. In Drakes Estero, eelgrass (*Zostera marina*) is the dominant form of submerged aquatic vegetation and is present throughout Drakes Estero in dense beds. Eelgrass beds provide important foraging and feeding ground for many aquatic organisms, they serve as the base of the food web in many coastal habitats, and they perform important environmental functions, such as trapping sediment, taking up excess nutrients, and protecting shorelines from erosion. Eelgrass beds are classified as a type of “special aquatic site,” a category of “Waters of the United States” afforded additional consideration under the Clean Water Act section 404 (b)(1) guidelines developed by the EPA. Special aquatic sites possess characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These sites are recognized as significantly influencing or positively contributing to the overall environmental health or vitality of the entire ecosystem of a region. DBOC operations in Drakes Estero and the eelgrass beds interact “via changes each makes to the immediate environment like altering water flow, sediment structure, light penetration, and nutrient supply. Other environmental changes arising from mariculture come from the addition of structures (e.g., bags, racks, and lines) and disturbances of transportation and culture operations” (NAS 2009). The termination or continuation of these activities related to DBOC operations could beneficially or adversely impact eelgrass. Therefore, the impact topic of eelgrass is retained for detailed analysis in this EIS.

Wildlife and Wildlife Habitat. Drakes Estero provides habitat for multiple native wildlife species, including benthic fauna (animals living on or in the submerged substrate), fish, harbor seals, and birds. Drakes Estero also includes privately owned species cultivated by DBOC, as well as nonnative invasive species such as the tunicate, *Didemnum vexillum* and the mud snail, *Batillaria attramentaria*. Commercial shellfish operations could potentially impact these species and their habitat through habitat competition, habitat improvement or degradation, noise and physical disruptions, and introduction of nonnative species. The impact topic of wildlife and wildlife habitat is retained for detailed analysis in this EIS.

Special-status Species. The Endangered Species Act (ESA) mandates that all federal agencies consider the potential impacts of their actions on species listed as threatened or endangered in order to protect the species and preserve their habitats. Potential impacts are assessed within an “action” area, which can be larger than individual project areas, and are determined by evaluating the geographic extent of potential environmental changes (i.e., biological, chemical, and physical effects). USFWS and NMFS share

responsibility for implementing the ESA. Per informal consultations with USFWS in 2010 and previous studies, seven federally listed threatened and endangered species and/or their critical habitat were identified for consideration. After further consultation with USFWS and NMFS and further review of the available and relevant scientific literature, only two species and/or their critical habitat were identified as potentially affected by activities within the project/action area. These include central California coast Coho salmon (*Oncorhynchus kisutch*) and central California coast steelhead (*O. mykiss*). The Coho salmon also is a state-listed species. Based on the location of DBOC's offshore operations relative to these fish species and/or their critical habitat, and resultant threats to those protected resources, the impact topic of special-status species is retained for detailed analysis in this EIS. For a description of the five special-status species that were considered but dismissed from further analysis, please see the "Issues and Impact Topics Considered but Dismissed from Further Analysis" section below.

Coastal Flood Zones. Pursuant to Director's Order 77-2: *Floodplain Management* (DO-77-2), the NPS must strive to preserve floodplain values and minimize hazardous floodplain conditions (NPS 2003a). Although no formal floodplain mapping has been undertaken at the planning site, a topographic survey was performed at the onshore facilities based on North American Vertical Datum of 1988 (NAVD-88). Direct observations of flooding made it necessary to survey the area for elevations, so the impact topic of coastal flood zones could be reasonably evaluated. The purpose of the survey was to verify the topographic elevations of the onshore features and correlate those elevations to elevations associated with flood events. Further, it has been observed that some buildings associated with DBOC operations have been prone to flooding during high tide and storm events. Within a 2006 CDPH report, it was noted that "during extreme hydrographic conditions, Estero water floods into the oyster company's plant area. Extreme high tides (over 6 feet), rainfall and winds can all combine to bring water over the Estero banks and into the DBOC plant area. This occurs once or twice a year (Kevin Lunny, pers. comm.)" (Baltan 2006). In addition, NOAA identifies regions subject to potential tsunami inundation, and Drakes Estero falls within the tsunami inundation zone (State of California Emergency Management Agency 2009). Placement of structures within the 100-year floodplain is inconsistent with NPS floodplain management policies, and the continued presence of these structures in the floodplain has the potential to impact floodplain values, DBOC facilities, and the safety of those employees living in structures within the coastal flood zone. The impact topic of coastal flood zones is retained for detailed analysis in this EIS.

Water Quality. DBOC commercial shellfish operations within and adjacent to Drakes Estero have the potential to impact both surface and groundwater quality. Nonpoint sources of pollution specific to land development and the commercial shellfish operations include onshore impervious stormwater runoff, boat operation, pulse disturbances to the Estero substrate from maintaining oyster racks and placing/overturning/removing bottom bags in Drakes Estero, accidental spill of fuel/oil, and accidental spill/leaks of wastewater from underground septic tanks. In addition, water used to clean the oysters and other discharges from sources used in the cultivation process may contribute to water quality impacts. Floating debris (plastic tubing, bags, piping, etc.) associated with the commercial shellfish operation may also impact water quality. As identified during public scoping, shellfish cultivation in Drakes Estero (specifically the presence of filter-feeding organisms) may result in beneficial impacts on water quality. The impact topic of water quality is retained for detailed analysis in this EIS.

Soundscapes. In accordance with NPS *Management Policies 2006* and Director's Order 47: *Soundscape Preservation and Noise Management* (DO-47), an important part of the NPS mission is preservation of natural soundscapes within units of the national park system (NPS 2006d, 2000). Natural soundscapes

“encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. Natural sounds occur within and beyond the range of sounds that humans can perceive, and they can be transmitted through air, water, or solid materials” (NPS 2006d). As identified during public scoping, components of DBOC operations, such as motorized boats and onshore equipment, create noise that may impact park visitors and wildlife and disturb the natural soundscape of the area. The impact topic of soundscapes is retained for detailed analysis in this EIS.

Wilderness. A wilderness area is defined, in part, as “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. . . . An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation” (PL 88-577). Pursuant to PL 94-544 and 94-567, Congress designated the waters of Drakes Estero as potential wilderness. Drakes Estero was designated as potential wilderness rather than full wilderness due to the presence of the commercial oyster operation, a nonconforming use. Cessation of DBOC’s commercial operations upon expiration of existing authorizations would allow the congressionally designated potential wilderness to be converted to congressionally designated wilderness. Conversely, should a new SUP be issued, the area would remain as congressionally designated potential wilderness for another 10 years. The impact topic of wilderness is retained for detailed analysis in this EIS.

Visitor Experience and Recreation. The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in park units. During public scoping it became evident that some visitors to the Seashore view the commercial shellfish operation as an integral part of their visit, while other visitors view the commercial operation as an adverse impact on their enjoyment of solitude and the natural setting and resources of the site, as well as their wilderness experience. For those visitors that view the commercial shellfish operation as an integral part of their visit to the Seashore, expiration of existing authorizations may reduce the satisfaction of these visitors, because they would no longer be able to purchase oysters or interact with DBOC staff. On the other hand, if a new 10-year SUP is issued to DBOC to continue its commercial shellfish operation, Seashore visitors seeking to experience the wilderness of Drakes Estero, as defined by the Wilderness Act of 1964 as, “outstanding opportunities for solitude or a primitive and unconfined type of recreation,” would be adversely affected. Therefore, the impact topic of visitor experience and recreation is retained for detailed analysis in this EIS.

Socioeconomic Resources. As part of the NEPA process, the NPS assesses the impacts of each alternative on socioeconomic resources. Expiration of the existing RUO and associated SUP and termination of DBOC’s commercial operations could result in adverse impacts on the current staff and on DBOC, as well as on the regional economy and statewide shellfish production. The impact topic of socioeconomic resources is retained for detailed analysis in this EIS.

NPS Operations. Each of the proposed alternatives could result in changes to Seashore operations and infrastructure near and within Drakes Estero. Seashore staff and available funding are key elements to promoting and protecting natural and cultural resources within the Seashore. Issuance of a new SUP to DBOC would require improved SUP monitoring and enforcement by Seashore staff, including review of proposed changes at DBOC and coordination with other state and local agencies. The impact topic of NPS operations is retained for detailed analysis in this EIS.

Issues and Impact Topics Considered but Dismissed from Further Analysis

The following impact topics were considered but dismissed from further analysis because either (a) the resources do not exist in the project area or would not be impacted by the project or (b) impacts would be less than minor⁷. Dismissed topics include vegetation, special-status species – silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog (*Rana aurora draytonii*), leatherback sea turtle (*Dermochelys coriacea*), western snowy plover (*Charadrius alexandrinus nivosus*), and California least tern (*Sternula antillarum browni*), water quantity, lightscapes, air quality, climate change and greenhouse gas emissions (carbon footprint), local food, geological resources, paleontological resources, cultural resources, and environmental justice. A brief rationale for the dismissal of each impact topic is provided below.

Vegetation. Vegetation cover types within the Drakes Estero watershed include wetlands, coastal dune, coastal scrub, grassland, pasture, and riparian woodland. Coastal scrub and wetlands are the only vegetation types that exist within the immediate project area. Several rare plants (appendix E) are known to exist within these habitat types. Wetlands are discussed as a separate impact topic, because there is the potential for these resources to be impacted by the alternatives considered in this EIS. The coastal scrub vegetation cover type is present around the onshore DBOC facilities and along the main access road. The proposed alternatives would not directly impact the coastal scrub vegetation. The rare plants known to exist in the area (based on inventory data provided by the NPS) would not be impacted by the project as they are located within areas that are outside the area of direct and indirect impacts, including some of the adjacent coastal scrub areas and within vegetated intertidal (NPS 2010f). Therefore, the impact topic of vegetation is dismissed from further analysis in this EIS.

Special-status Species. As mentioned above, seven federally listed threatened and endangered species were identified for consideration. Five of these species have been dismissed from further analysis in the EIS due to a lack of designated critical habitat in the project/action area, unconfirmed presence of the species in the project/action area, or the potential for less than minor impacts on the species and/or their critical habitat. These include Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog (*Rana aurora draytonii*), leatherback sea turtle (*Dermochelys coriacea*), western snowy plover (*Charadrius alexandrinus nivosus*), and California least tern (*Sternula antillarum browni*). A brief explanation of the justification for dismissal for each species is provided below.

Myrtle's Silverspot Butterfly (Speyeria zerene myrtleae). Myrtle's silverspot butterfly was federally listed as endangered in 1992 (USFWS 1992). The historic range of the butterfly in California is believed to have extended from the mouth of the Russian River in Sonoma County to Point Año Nuevo in San Mateo County (Launer et al. 1992). Typical habitat for Myrtle's silverspot butterfly and its host plant includes coastal dunes, coastal scrub, or coastal prairies that are protected from wind, at elevations from sea level to 1,000 feet, up to 3 miles inland (USFWS 1998).

Plant species at the Seashore known to attract adult Myrtle's silverspot butterfly include western dog violet (*Viola adunca*), curly-leaved monardella (*Monardella undulata*), yellow sand-verbena (*Abronia latifolia*), seaside daisy (*Erigeron glaucus*), bull thistle (*Cirsium vulgare*), gum plant (*Grindelia* spp.), and mule ears (*Wyethia* spp.). Of these, the western dog violet serves as the host plant (i.e., the plant on which

⁷ Minor impacts are generally defined as being slight but detectable, typically short-term and localized.

females lay eggs) and is the only known food plant used by butterfly larva once they emerge from eggs. Other flowering plants provide nectar sources for adult butterflies (USFWS 2009).

Coastal scrub habitat surrounds the DBOC onshore facilities and entry road. Surveys conducted in 2003 verified the presence of butterfly populations within the Seashore and the butterfly has been documented on grasslands surrounding the project area (USFWS 2009). However, records do not indicate that Myrtle's silverspot butterfly exists within the project/action area. If species were present in the project area, threats such as the potential for vehicle strikes/mortality would be less than minor due to the slow speeds and low usage of the access road.

California Red-legged Frog (Rana aurora draytonii). The California red-legged frog was listed as federally threatened in 1996 (USFWS 1996). Revised critical habitat for this species was designated in 2010 (USFWS 2010). The frog requires a variety of habitats for normal biological activity, including aquatic breeding areas, riparian habitat, and upland dispersal habitats used during migration between breeding areas. Aquatic breeding habitats include pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds, and lagoons. Additionally, California red-legged frogs frequently breed in artificial impoundments, such as stock ponds (USFWS 2002b). Historically, the frog has been observed at elevations ranging from sea level to 5,200 feet above sea level, but it has been extirpated (eliminated) in 70 percent of its former range.

Since 1993, the U.S. Geological Survey Biological Resources Division has conducted surveys of aquatic amphibian habitat in the Seashore. The surveys have identified more than 120 California red-legged frog breeding sites within the Seashore, supporting a total adult population of several thousand frogs (NPS 2007a). Approximately two-thirds of the breeding sites are on ranch lands, with a large proportion occurring at stock ponds used by ranchers. Based on survey data, important habitat for red-legged frogs also includes streams with relatively low gradients that have late-season water flow or water retention in pools. On Point Reyes Peninsula, such creeks support relatively few of the documented occurrences of the frogs, but may serve as important connectors to other breeding and refuge habitats. Examples of Seashore streams with this habitat are found in the Drakes Estero watershed.

California red-legged frogs are documented in East Schooner, Home Ranch, Limantour, Glenbrook, Muddy Hollow, and Laguna creeks (USFWS 2008). In addition, the federally designated critical habitat encompasses the landward boundary of Drakes Estero. However, recent surveys and records do not indicate that the California red-legged frog exists within the project/action area. Due to the saline conditions of Drakes Estero, it is unlikely that the project/action area would serve as habitat for the California red-legged frog. Further, if the species were found to be present in the project area, the proposed actions of the onshore operations would be less than minor due to limited actions outside the existing developed footprint.

Leatherback Sea Turtle (Dermochelys coriacea). The leatherback sea turtle was listed as federally endangered in 1970 (USFWS 1970). Critical habitat was designated by NMFS in 2012 and although Drakes Estero is included in the geographic area designated as critical habitat (NMFS 2012a), further consultation with NMFS revealed that critical habitat for leatherback turtles does not extend into estuarine habitat (NMFS 2012b). As an estuary, Drakes Estero is therefore not included in the critical habitat designated for leatherback sea turtles. Leatherback sea turtle occurrences have not been recorded within

the project/action area. Based on the nesting and foraging habitat requirements, it is unlikely that the turtles would use the shallow estuarine or land habitats associated with Drakes Estero.

Western Snowy Plover (Charadrius alexandrinus nivosus). Western snowy plover was listed as federally threatened in 1993 (USFWS 1993). In 2005, the USFWS designated 12,145 acres of critical habitat for western snowy plover, including portions of Marin County. Based on federal reassessment of conservation needs proposed, updates to western snowy plover critical habitat were recommended in 2010, increasing the total acres of critical habitat to 28,261. Habitat for the plover includes beaches, dry mudflats, dry salt flats, and sandy shores. The plover nests on the ground in broad open spaces with sparse clumps of vegetation that allow protective cover for chicks. Nests also occur beside or under protective objects (Page et al. 2009). The plover's diet includes small insects, small crustaceans, and other minute vertebrates (Terres 1980).

The western snowy plover uses the Point Reyes Peninsula as wintering and nesting habitat. During the 1980s, nesting took place along the entire Great Beach, on the far east end of Drakes Beach near the mouth of Drakes Estero, and at Limantour Spit. In recent years, erosion along the southern portion of Great Beach has diminished the upper beach area such that the entire beach can be washed by waves. Nesting is occurring on the northern portion of this beach, between the North Beach parking area and Kehoe Beach, which is backed by extensive dunes. Between 2001 and 2005, snowy plover nests were observed on this northern portion of Great Beach. Plovers also nest along the western edge of Abbotts Lagoon.

Limantour Spit, the point at which Drakes Estero meets Drakes Bay, has historically been used as nesting habitat by plovers; however, no nests have been observed there since 2000 (Peterlein 2009). The nearest current areas of critical habitat include Limantour Spit and all the Seashore beaches lining the northwest shore of the Point Reyes Peninsula (USFWS 2011a). Despite the close proximity of critical habitat and nesting locations/habitat, there are no known records of western snowy plover observations within the project/action area, and potential impacts of proposed operations are considered negligible.

California Least Tern (Sternula antillarum browni). The California least tern was listed as federally endangered in 1970 and state endangered in 1971 (USFWS 1985b). Least terns nest in loose colonies on relatively open beaches with no vegetation, along lagoon or estuary margins. Foraging habitat includes shallow estuaries or lagoons with abundant populations of small fish or other small prey. Terns usually dive for their prey and rest or loaf on sandy beaches and mudflats (NatureServe 2011). While no least terns are known to exist within the Seashore (including the project area), potentially suitable habitat types do exist. However, the nearest known population is located in the San Francisco Bay Area.

Water Quantity. Impacts on fresh water quantity are related to the amount of ground water DBOC uses for wastewater and potable uses. The amount of well water used by DBOC does not noticeably impact the availability of fresh water in the area and was therefore not retained as an impact topic for further analysis in the EIS.

Lightscaapes. In accordance with NPS *Management Policies 2006*, the NPS strives to preserve natural ambient landscapes and other values that exist in the absence of human-caused light (NPS 2006d). There are two pole-mounted overhead lights within the project area to provide safety lighting after dark. Low levels of light also emanate from the DBOC residences. DBOC does not perform commercial shellfish

operations after dark. In addition, visitor use of the area after dark is minimal. These low levels of light do not have a noticeable impact on natural resources or visitor enjoyment. Should DBOC require additional lighting in the future (if an action alternative is selected), then new lighting shall be designed to protect and preserve the night sky/darkness and minimize light pollution in Drakes Estero, as indicated by the SUP (NPS 2008b). Given the proximity of the project area to the San Francisco metropolitan area, the lightscape within the Seashore has already been degraded by the light pollution surrounding San Francisco. The impact topic of lightscapes is dismissed from further analysis in the EIS.

Air Quality. The Seashore, a Class I airshed, is located within the San Francisco Bay nonattainment areas for 8-hour ozone, 1-hour ozone, and fine particulate matter (less than 2.5 micrometers) (PM_{2.5}) as defined by the National Ambient Air Quality Standards set forth in the Clean Air Act (EPA 2011) and further specified by the Bay Area Air Quality Management District (BAAQMD 2010). The primary air pollutant sources associated with the San Francisco Bay Area are related to urban activities (i.e., commuting). Ongoing activities within the Seashore have a minimal contribution to air pollution in the nonattainment area.

Volatile organic compounds (VOCs) are a general class of compounds containing hydrogen and carbon and are a precursor to the formation of the pollutant ozone. While concentrations of VOCs in the atmosphere are not generally measured, ground-level ozone is measured and used to assess potential health effects. When combustion temperatures are extremely high, as in automobile engines, atmospheric nitrogen gas may combine with oxygen gas to form various oxides of nitrogen. Of these, nitric oxide (NO) and nitrogen dioxide (NO₂) are the most significant air pollutants. This group of pollutants is generally referred to as nitrogen oxides or NO_x. Nitric oxide is relatively harmless to humans but quickly converts to NO₂. Nitrogen dioxide has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOCs, are also precursors to ozone formation. Emissions of VOCs and NO_x react in the presence of heat and sunlight to form ozone in the atmosphere. Accordingly, ozone is regulated as a regional pollutant and is not assessed on a project-specific basis.

The “de minimis” emissions limits for general conformity with federal actions (i.e., “thresholds”) for nonattainment ozone and particulate matter are presented in table 1-1 below. Because ozone is a by-product of volatile organic compounds and nitrogen oxide, threshold levels for ozone are based on threshold levels of ozone precursors: VOCs and NO_x. The threshold levels for VOCs and NO_x are 54 pounds/day and 10 tons/year. Threshold levels for PM_{2.5} also are 54 pounds/day and 10 tons/year (BAAQMD 2010).

DBOC’s direct and indirect emissions contribution to nonattainment was estimated for all activities (i.e., motorboats, maintenance equipment, employee vehicles, and trucks for transporting the shellfish). The results indicate that all DBOC emissions are equal to or below 3.5 tons per year for all nonattainment pollutants (table 1-1). The calculated levels for DBOC emissions related to NO_x are 2 to 4 pounds/day and 0.3 to 0.5 tons/year. The calculated levels for reactive organic gas (ROG) are 11 to 24 pounds/day and 1.6 to 3.5 tons/year. The calculated levels for both ozone precursors, ROG⁸ and NO_x, from DBOC operations fall well below threshold levels. The levels of PM_{2.5} discharge from DBOC boat emissions are considered to be negligible.

⁸ According to EPA, VOC and ROG are synonymous. VOC excludes methane and ethane and ROG, as used by California, only references methane.

TABLE 1-1. NONATTAINMENT AREA DE MINIMIS LEVELS AND DBOC ESTIMATES

Pollutant	De Minimis Threshold Level (pounds/day)	De Minimis Threshold Level (tons/year)	DBOC Estimate (pounds/day)	DBOC Estimate (tons/year)
Ozone (VOCs or NO _x)			11-24	1.6-3.5
Serious NAAs		50		
Severe NAAs		25		
Extreme NAAs	54	10		
NO _x	54	10	2-4	0.3-0.5
PM _{2.5}				
Direct Emissions	54	10	negligible	negligible

Source: 40 CFR 93.153; DBOC [Lunny], pers. comm., 2011h

Notes: VOCs = volatile organic compounds

NO_x = nitrogen oxide

NAAs = nonattainment areas

PM_{2.5} = particulate matter <2.5 micrometers

DBOC operations meet general conformity requirements because their regional emissions are well below the de minimis threshold levels established by federal and state general conformity requirements. If the no-action alternative is selected, emission levels would be well below levels calculated for DBOC operations, as all motorized activity in the water and onshore would cease with the exception of vehicles using the access road for the kayak launch and occasional administrative use of motorized boats, which would be subject to evaluation under minimum requirements and minimum tool determination processes as required by the Wilderness Act. Under the action alternatives, DBOC emissions, as estimated above, would continue at similar levels. Based on the calculated levels, the impact topic of air quality is dismissed from detailed analysis in this EIS.

Climate Change and Greenhouse Gas Emissions (Carbon Footprint). Climate change refers to any significant change in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality, storm frequency, etc.) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the NAS, and the United Nations Intergovernmental Panel on Climate Change (IPCC) provide clear evidence that climate change is occurring and will accelerate in the coming decades. There is strong evidence that global climate change is being driven by human activities worldwide, primarily the burning of fossil fuels and tropical deforestation. These activities release carbon dioxide and other heat-trapping gases, commonly called “greenhouse gases,” into the atmosphere (IPCC 2007a, 2007b, 2007c, 2007d).

There are two aspects of climate change that must be considered in an environmental impact analysis:

- Human impact on climate change: i.e., through actions, the potential to increase or decrease emissions of greenhouse gases that contribute to climate change
- The impact of climate change on humans: i.e., how the resources that are managed are likely to change in response to changing climate conditions, and how that changes or otherwise affects management actions and the impacts of those actions on the resource

Some of the activities associated with DBOC operations result in fossil fuel consumption (e.g., motorboats within Drakes Estero, trucks associated with the transportation of shellfish, and vehicles

carrying visitors to the area). Equipment used to maintain DBOC facilities, access roads, and parking areas also consume fossil fuels. However, greenhouse gas emissions associated with any of the alternatives involving issuing a new SUP would likely be negligible.

Additionally, some comments submitted during public scoping suggested that the quantity of greenhouse gas emissions (the carbon footprint) associated with oyster consumption would increase if a new SUP was not issued to DBOC (the no-action alternative) because of the loss of the local food source. Some comments suggested that without DBOC, the distance oysters would be transported to meet demand in the San Francisco Bay Area would greatly increase, thus increasing the overall greenhouse gas emissions. It is not clear how the shellfish market would respond should this local source cease operations. Local demand could be met in the future by various means. Oysters could be shipped in from outside the local area, which would increase the carbon footprint associated with transporting the product. Conversely, other local commercial shellfish operations may increase their production and distribution of oysters to the local market, which would result in a carbon footprint similar to existing conditions. Oyster production in California, as a whole, appears to be increasing at a rate greater than DBOC's production. For example, as described in chapter 3, in 2010, DBOC produced 585,277 pounds of shucked oyster meat (6.89 million oysters), a 28 percent increase over 2009 production levels. During this same period, the California oyster market increased 43 percent. An increase in Pacific oyster production in Humboldt Bay was the primary contributor to this change (the California Pacific oyster market increased 48 percent, by weight, between 2009 and 2010) (CDFG 2011e). Based on this information, it is likely that at least some portion of the current DBOC production could be accommodated by other operations in the state of California. Agencies are not required to engage in speculation or analyze indirect effects that are highly uncertain (CEQ 1981, Q18 [48 Fed. Reg. 18027]). Because there is no certainty regarding how the shellfish market and demand would respond to the proposed action, impacts from global carbon emissions cannot be meaningfully and/or quantifiably analyzed. While greenhouse gas emissions associated with the no-action alternative may potentially be greater due to increased transportation distances, they are also likely to be negligible in comparison to local, regional, and national greenhouse gas emissions.

In addition, the effects of climate change on park resources over the 10-year planning horizon for this EIS are likely to be negligible. Issues associated with climate change's impact on the Seashore resources (rising sea temperatures, sea level rise, ocean acidification, etc.) are addressed in applicable sections of chapters 3 and 4. The contribution of the actions contemplated in this EIS on climate change is likely to be negligible and is dismissed from further analysis.

Local Food. DBOC grows and processes oysters and clams onsite and supplies these products to the surrounding communities. Approximately 40 percent of these products are sold to onsite customers, 40 percent is sold directly to local markets and restaurants, 18 percent is sold to Tomales Bay shellfish growers, and 2 percent is sold through a wholesale seafood distributor based in San Francisco (DBOC 2012b^{xlix}). DBOC imports shellfish in the form of larvae (and seed) from CDFG-certified sources in compliance with a "Long-term Permit to Import Live Aquatic Animals into California" issued by CDFG. CDFG-certified hatcheries are located in Hawaii and along the U.S. west coast. DBOC's 2006 proof of use report shows that 1 million Manila clam seeds were acquired from Kona Coast Shellfish in Hawaii. For Pacific oyster larvae and seed, CDFG generally uses hatcheries on the west coast. For instance, for 2011, DBOC holds permits to import larvae/seed from Taylor Shellfish Farms in Washington (Permit MR-L-10-029) and Whiskey Creek Shellfish Hatchery in Oregon (Permit MR-L-10-028). However, DBOC has also used seed from Coast Seafoods Company in California and Kona Coast Shellfish in Hawaii.

While many people in the Bay Area enjoy these natural foods, other proteins, such as beef, poultry, or finfish, also are produced in the vicinity of DBOC. In addition, other shellfish operations, such as the Tomales Bay Oyster Company and the Hog Island Oyster Company, both of which are in Tomales Bay proximal to DBOC (approximately 15-20 driving miles), contribute to the local oyster and clam supply. Similar to DBOC, these operations offer fresh shellfish for purchase onsite and to restaurants in the region. In addition to proteins, many other types of local foods are produced in Marin County and the Bay Area including dairy products, fruits, vegetables, and products derived from these food types. In 2011, aquaculture (oysters, mussels, and clams) accounted for 7 percent of the total agricultural production in Marin County. In comparison, livestock products such as milk and wool comprised 45 percent of the county total, while livestock (the animals themselves) and miscellaneous made up 28 percent (MCDA 2012). On average, DBOC has produced 513,152 pounds of seafood annually over the last 5 years, representing approximately 58 percent of the oysters in Marin County over this period (CDFG 2011e). As described further in the “Socioeconomic Resources” section of chapter 3, DBOC’s contribution to the county shellfish market declined since 2007 to approximately 50 percent, therefore, it is estimated that of the aquaculture produced in Marin County in 2011, approximately 50 percent was produced by DBOC, equivalent to approximately 3.5 percent of the overall agricultural production of the county (CDFG 2011e; MCDA 2012). Based on this information, any change in DBOC’s contribution to the local food supply would likely be negligible. For these reasons, the impact topic of local food has been dismissed from further analysis in the EIS.

Geological Resources. NPS *Management Policies 2006* directs the NPS to preserve and protect geologic resources as integral components of park natural systems (NPS 2006d). Cultivation of shellfish within Drakes Estero and the processing facilities on the land are unlikely to affect geologic processes and resources, including soils and topography. Current sediment transport processes, which may be impacted by actions proposed in this EIS, are analyzed in the water quality section of this EIS. The impact topic of geologic resources is dismissed from further analysis in the EIS.

Paleontological Resources. Paleontological resources are defined as “resources such as fossilized plants, animals, or their traces, including both organic and mineralized remains in body or trace form” (NPS 2006d). NPS *Management Policies 2006* directs the NPS to preserve and protect paleontological resources in terms of the geologic data associated with the resource to provide information about the ancient environment (NPS 2006d). Paleontological resources have been identified within the Seashore, including concretions near the project area. These resources are outside the immediate project area and therefore would not be impacted by the proposed actions. Additionally, it is unlikely that activities associated with the proposed actions would disturb any undiscovered paleontological resources, as ground disturbance is not proposed outside the development area. The impact topic of paleontological resources is dismissed from further analysis in the EIS.

Cultural Resources. The NPS categorizes cultural resources as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections (NPS 2006d). The National Historic Preservation Act (NHPA) mandates preservation programs in every federal agency and identifies the NPS as the lead historic preservation agency. NHPA requires federal agencies to identify properties eligible for listing on the National Register of Historic Places (National Register) and recognizes five property types: districts, sites, buildings, structures, and objects. Cultural landscapes are usually classified as either districts or sites, depending upon their character. While parks may contain properties or activities that are old, the NPS Cultural Resources program manages properties found

eligible for the National Register. Use of this site over time by customers and park visitors is not considered a historic or cultural resource. For a discussion of site use by visitors, see the “Visitor Experience and Recreation” section.

Under section 106 of the NHPA and implementing regulations 36 CFR 800, federal agencies must take into account the effects of their undertakings on significant historic properties and afford State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment as appropriate. The agency must seek ways to avoid, minimize or mitigate any adverse effects on historic properties. Concurrent with the NEPA process, a section 106 review is being conducted to determine whether the actions proposed in this EIS would result in an adverse impact on such resources. As part of this process, the California SHPO has been consulted regarding the eligibility of DBOC facilities for listing on the National Register. On April 1, 2011, the NPS notified the SHPO (and copied ACHP) of the intent to use this EIS process to meet section 106 consultation requirements. On October 18, 2012, the ACHP confirmed that they had reviewed the documentation provided and that their involvement in the section 106 review was no longer necessary (ACHP 2012, see appendix D). In a letter dated October 29, 2012, SHPO concurred with a finding of no adverse effects, although it was noted that unanticipated discovery or change in project description may require additional consultation under 36 CFR part 800 (SHPO 2012, see appendix D).

During a meeting with The Federated Indians of Graton Rancheria representative on July 14, 2011, the NPS also notified the Tribe that it planned to use this EIS process to meet section 106 consultation requirements. This was followed up by letter on August 10, 2011 (NPS 2011g). The Tribe responded in a letter dated August 29, 2011, noting their concurrence with the “request to use the EIS process to meet Section 106 ‘government to government’ consultation requirements” (FIGR 2011). Subsequently, on January 9, 2012, the NPS submitted a letter to The Federated Indians of Graton Rancheria to coordinate ongoing consultation and arrange a meeting to discuss the next steps for the proposed action, as related to section 106 consultation. Consultation with the Tribe was concluded on August 13, 2012, when The Federated Indians of Graton Rancheria submitted a letter of concurrence to NPS stating, “each of the four alternatives presented in the DEIS will have ‘no adverse effect’ on cultural resources under the standards set forth in 36 CFR 800.8(c)(1).” See appendix D for copies of these letters.

A Determination of Eligibility (DOE) was prepared for DBOC onshore and offshore facilities (Caywood and Hagen 2011). The DOE found that while the oyster-growing operation in Drakes Estero is significantly associated with the rebirth and development of the California oyster industry, which began in the 1930s, the property is ineligible for listing in the National Register because it lacks historic integrity. The period of historic significance for the site extends from 1957, when Charles W. Johnson assumed control of the Schooner Bay plant and the state oyster allotment, to about 1965, when his company successfully adapted Japanese off-bottom growing methods to the specific conditions of Drakes Estero. DOE project personnel conducted the documentation and assessment of the oyster farm in Drakes Estero as a potential cultural landscape.

Of the seven aspects of integrity (location, setting, materials, workmanship, design, feeling and association), the property retains for the most part, integrity of location, setting, and association. The processing plant and the racks in the estero are in their original locations, and the property’s setting—the pastoral landscape surrounding the bay—has been little altered since the early 1930s (Caywood and Hagen 2011). With regard to integrity of materials, workmanship, and design, however, virtually all of the resources in the plant have

been modified through structural additions and/or the application of modern materials. Some are in such poor condition that their structural integrity is threatened. Since the 1960s new materials and structures have been added, older structures removed or destroyed, and existing structures modified extensively. In addition, the design of the plant operation has been altered. Over the years processing systems and equipment have been removed, and the entire canning operation moved offsite due to health department concerns, then reestablished in a modern, hygienic shipping container. “Finally, the combination of alterations, including a general lack of material and design integrity, as well as the addition of modern structures, has altered the appearance of the Johnson Oyster Company operation, which in turn adversely affects the property’s integrity of feeling” (Caywood and Hagen 2011).

Today, the plant bears little resemblance to the facility of the early 1960s. In a letter dated April 5, 2011, the NPS submitted the DOE to the SHPO, requesting concurrence with the finding that the property is ineligible for listing on the National Register. The NPS received a response from the SHPO on August 4, 2011 (see appendix D) in which the SHPO concurred with the NPS determination that none of the facilities associated with DBOC’s operation are eligible for listing on the National Register (SHPO 2011).

Archeological Resources. Archeological resources are the remains of past human activity and records documenting the scientific or scholarly analysis of these remains. For over 2,000 years, humans have inhabited the Point Reyes Peninsula, employing its rich resources and modifying aspects of the landscape to meet their changing needs. Approximately 100 Coast Miwok archeological sites document a culture that was an integral part of the ecosystem (Sadin 2007). One known archeological site (CA-MRN-296) exists within the project area and is associated with the Coast Miwok whose descendents are members of The Federated Indians of Graton Rancheria, a federally recognized Tribe. The site is a contributing resource in a draft National Register of Historic Places district nomination for indigenous archeological sites within the Seashore. Under all proposed action alternatives, the known archeological site would be excluded from the SUP boundary. As with other sites in the Seashore, there is potential for site disturbance as a result of unauthorized access. Regular site monitoring and management, which is afforded all archeological sites in the Seashore, would be conducted to reduce potential impacts on this site.

Under all alternatives, if unknown archeological resources are discovered, the Seashore’s standard protocol for inadvertent discoveries would apply. The Cultural Resources Management Division would be notified immediately and work in the immediate area would cease until the discovery is evaluated by a qualified archeologist. The discovery process defined by 36 CFR 800.13, the implementing regulations for NHPA (16 U.S.C. 470), would be applied. Evaluation of the discovery’s significance would include consultation as appropriate with The Federated Indians of Graton Rancheria, SHPO, and the ACHP. In the event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered the process defined by 43 CFR 10.4-5, the implementing regulations of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), would be applied. NPS response to any discovery of human remains or sacred objects would include but not necessarily be limited to immediate notification of the Seashore’s Superintendent and Cultural Resources Division, cessation of work in the immediate vicinity, protecting the objects of discovery, notifying and consulting with The Federated Indians of Graton Rancheria, and preparing a written plan of action.

For the purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. For all ground disturbing activities within the onshore areas of DBOC, archeological identification studies, including construction monitoring by a qualified archeologist, may be

required to determine the presence of unknown or buried archeological resources. The impact topic of archeological resources is dismissed from further analysis in the EIS.

Cultural Landscapes. According to NPS-28: *Cultural Resource Management Guideline* (NPS 2002b), a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions. The oyster-growing facilities lie within but do not contribute to the significance of the Point Reyes Ranches Historic District, which was determined eligible for the National Register (Historical Research Associates, Inc. 2008). As described above, DBOC facilities were evaluated separately for listing on the National Register. While significantly associated with the California oyster industry from 1957-65, the property is ineligible for listing in the National Register because it lacks historic integrity. For the purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. The impact topic of cultural landscapes is considered but dismissed from further analysis in the EIS.

Historic Structures. A historic structure is defined by NPS-28 as “a constructed work, usually immovable by nature or design, consciously created to serve some human act” (NPS 2002b). As described above, a DOE was conducted to identify properties within the project area that are eligible for listing on the National Register. While the Seashore preserves over 300 historic structures, such as the Point Reyes Lighthouse, listed in the National Register, and the Point Reyes Lifeboat Station, a National Historic Landmark, none of the structures within the project area are eligible for listing on the National Register. For purposes of section 106 of the NHPA, impacts under any of the alternatives would result in a determination of no adverse effect. The impact topic of historic structures is considered but dismissed from further analysis in the EIS.

Ethnographic Resources and Sacred Sites. An ethnographic resource is defined as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (NPS 2002b). The Federated Indians of Graton Rancheria are culturally affiliated with the Seashore and have expressed concern that their cultural legacy may be impacted if a new SUP is issued to DBOC (FIGR 2007). However, no traditional cultural properties have been identified within the project area. One Coast Miwok archeological site has been identified within the project area; however, the project would not affect this site, as described above under “Archeological Resources.” The impact topic of ethnographic resources and sacred sites is considered but dismissed from further analysis in the EIS.

Indian Trust Resources. The federal Indian Trust is a legally enforceable obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it creates a duty to carry out the mandates of federal laws with respect to Native American Tribes. Of the federally recognized Tribes pursuant to PL 103-454, 108 Stat. 4791, The Federated Indians of Graton Rancheria/Coast Miwok is the only Tribe affiliated with the Seashore. However, there are no known Indian Trust resources in the study area, and the lands composing the Seashore are not held in trust by the Secretary for the benefit of Indians. The impact topic of Indian Trust resources is considered but dismissed from further analysis in the EIS.

Museum Collections. A museum collection is an assemblage of objects, works of art, historic documents, and/or natural history specimens collected according to a rational scheme and maintained so that they can be preserved, studied, and interpreted for public benefit (NPS 2002b). The project area does

not include any museum collection or objects. The impact topic of museum collections is considered but dismissed from further analysis in the EIS.

Environmental Justice. Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-income Populations,” requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental impacts of their programs and policies on minorities and low-income populations and communities (EPA 1994). The guidance provides six principles for consideration of environmental justice, which are: 1) composition of affected area and whether there are low-income populations, minority populations, or Indian tribes, 2) public health and industry data for assessment of environmental hazards, 3) recognition of interrelated cultural, social, occupational, historical, or economic factors that could amplify environmental effects, 4) encouragement of public participation and accommodations to overcome linguistic, cultural, institutional, geographic, and other barriers, 5) meaningful community representation with awareness of diverse constituencies, and 6) soliciting tribal representation. Applicable principles are discussed in the following paragraphs.

The NPS notes that many of the 31 employees at DBOC individually qualify as low-income and/or minority. However, under the thresholds established by the Executive Order, the employees themselves do not constitute a low-income or minority population, other than as part of the community in which DBOC is located. Adverse impacts to DBOC employees related to the proposed alternatives are limited to socioeconomic impacts. While not appropriate as a topic for environmental justice, economic impacts of the proposed action at the Inverness CDP, Marin County, and State of California level are retained for analysis in this EIS under socioeconomic resources. Existing socioeconomic conditions and the potential impacts associated with the proposed alternatives are described in the affected environment and environmental consequences chapters (chapters 3 and 4) of this EIS.

CEQ’s “Environmental Justice Guidance Under the National Environmental Policy Act” provides guidance to federal agencies on how to determine the presence of low-income and minority populations within an appropriate unit of geographic analysis. The guidance defines the identification of a minority population where either “(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis” (CEQ 1997).

For the purposes of this EIS, the affected area (area of analysis) for environmental justice is Inverness Census Designated Place (CDP). This is consistent with the scale used to describe the socioeconomic impacts of the project on a local level. Marin County is used for comparative purposes, as it is the next-largest scale used to describe socioeconomic impacts. According to 2010 census data, the total population of Inverness is 1,304. As shown in table 3-7 in chapter 3, the minority population of Inverness CDP make up 7.1 percent and of the total population. Six percent of the CDP’s population is of Hispanic descent.

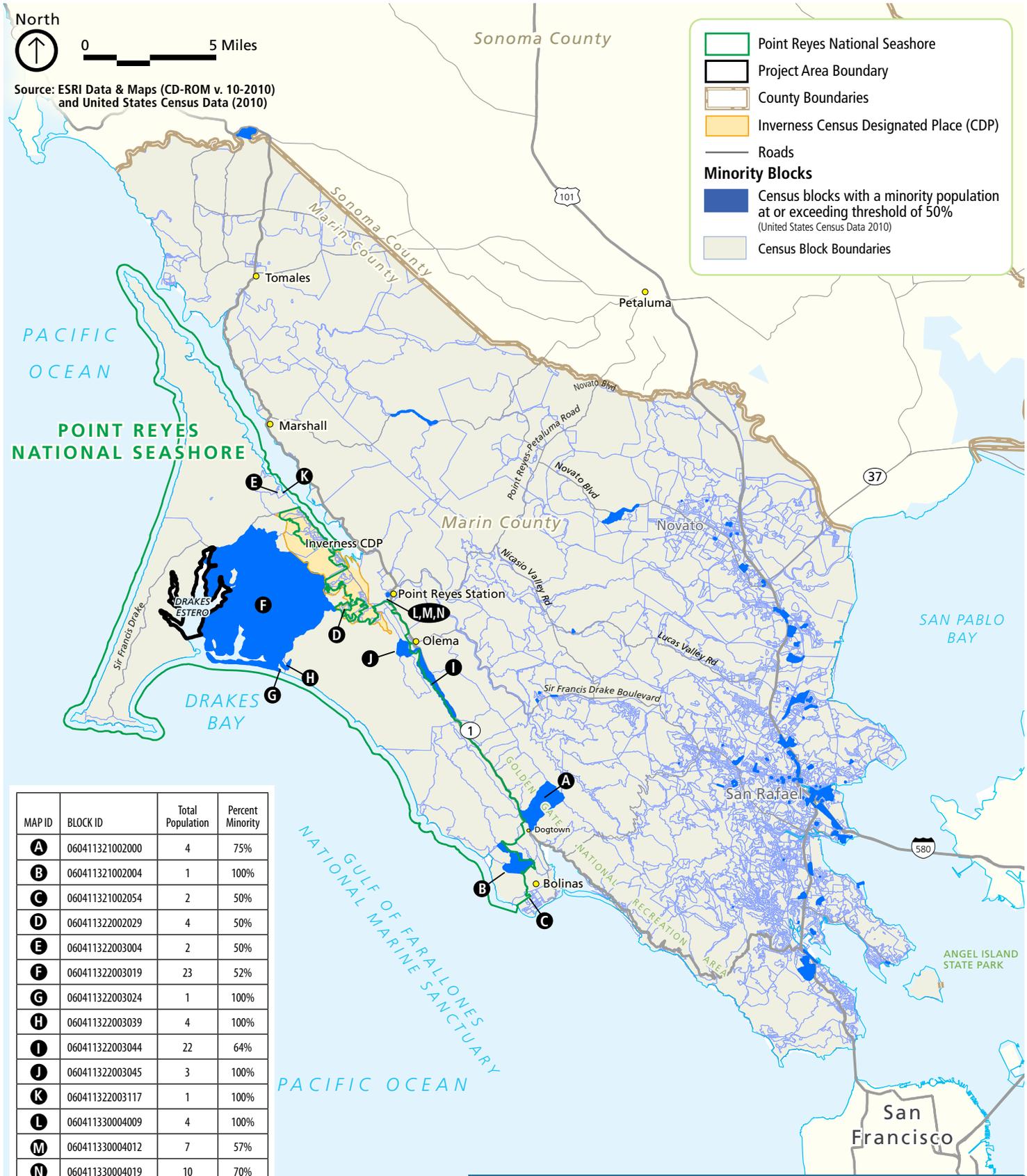
In comparison, the minority population of Marin County, which is used herein as the general population, is 20 percent, with a total population of 252,409. Marin County residents of Hispanic descent make up 15.5 percent of the county’s population. It should be noted that the concept of race is different than the concept of Hispanic origin. Therefore, the U.S. Census collects separate data on Hispanic and minority populations. Specifically, Hispanic is not considered a minority population by the U.S. Census and must be considered independently from race. For example, nearly half of the Marin County residents who

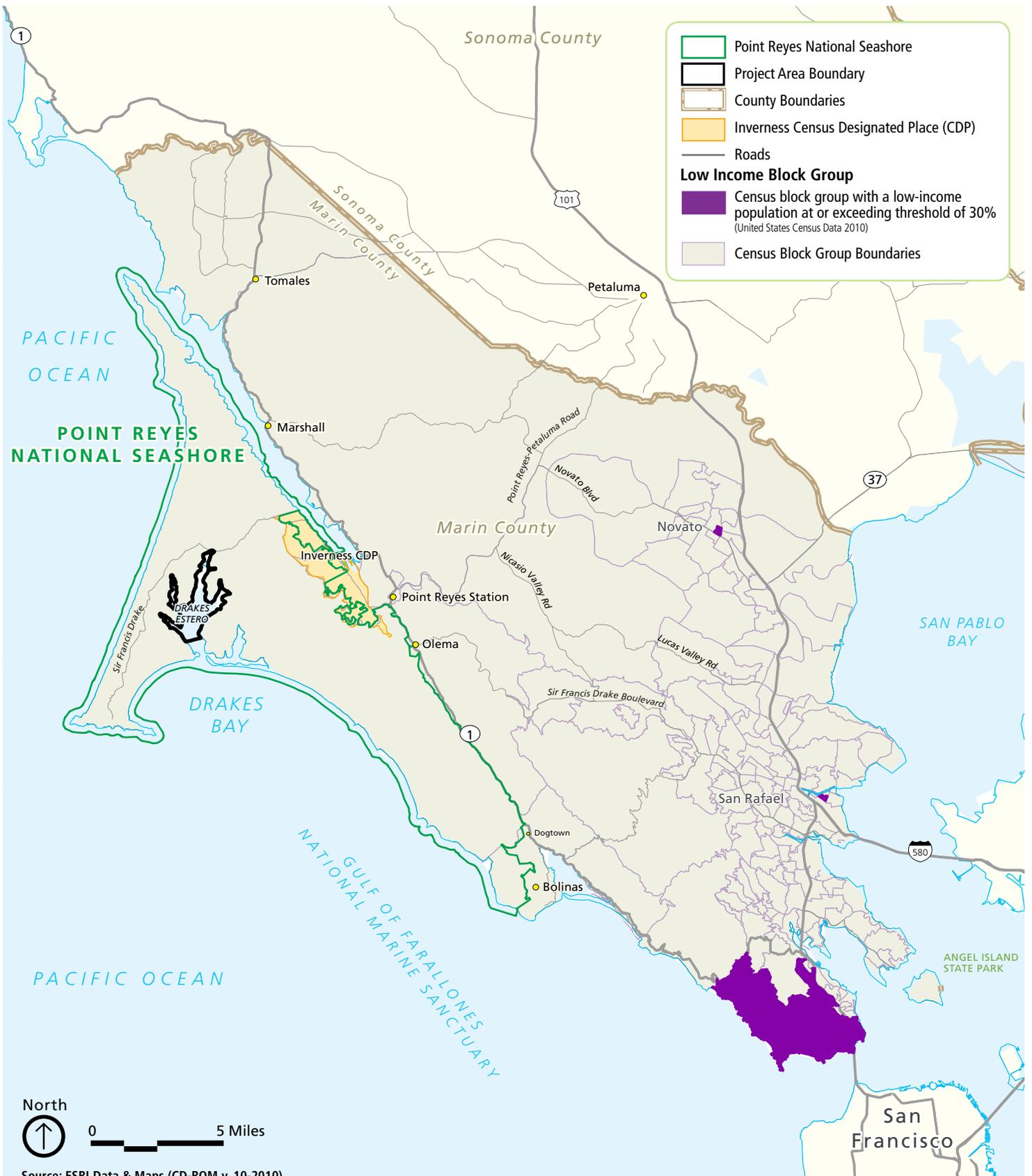
reported to be Hispanic in 2010 indicated that their race was “white only.” The remaining 54 percent of the Hispanics within the county specified another race, stated they were of “some other race”, or indicated they were of two or more races (U.S. Census Bureau 2010). Those Hispanics that reported to be “white only” are not considered minority. Similarly, 51 percent of the Hispanic population in Inverness CDP reported to be “white only” (U.S. Census Bureau 2010). As such, it is not appropriate to add the Hispanic and minority percentages together to achieve an overall minority percentage. This would result in double counting and an inflation of the actual minority population in Inverness CDP and Marin County. In accordance with CEQ regulations and thresholds, Inverness CDP does not meet the criteria of an environmental justice population based on its minority population, as the minority population is well below both the CEQ threshold of 50 percent and is not meaningfully greater than the minority population percentage in the general population. Figure 1-5 shows the Inverness CDP and its minority composition. It should be noted that to illustrate the general distribution of minority populations within the affected area, figure 1-5 identifies census blocks with minority populations that exceed the CEQ threshold of 50 percent. Evaluating minority populations at this scale would inflate the intensity of impacts; therefore, Inverness CDP has been determined to be the more appropriate scale, and the block data is provided for informational purposes only.

A similar analysis was used to determine whether the affected area constitutes a low-income environmental justice population. CEQ’s “Environmental Justice Guidance Under the National Environmental Policy Act” specifies, “Because CEQ guidance does not provide a specific threshold to identify low-income populations, U.S. Census 2010 data was compared to thresholds defined by the Metropolitan Transportation Commission (MTC) during development of their Transportation Improvement Program for the San Francisco Bay Area. The MTC established a low-income threshold of 30 percent, whereby any community whose population consists of more than 30 percent low-income residents would be considered a “community of concern” (MTC 2010). According to 2010 census data, the low-income population of Inverness CDP make up 12.8 percent and of the CDP’s total population. In comparison, the low-income population of Marin County is 7.0 percent. As such, in accordance with CEQ regulations and thresholds, Inverness CDP does not meet the criteria of an environmental justice population based on its low-income population, as the population meeting the criteria for low-income is well below the regional threshold of 30 percent. Figure 1-6 shows the distribution of low-income populations within Inverness CDP. Similar to figure 1-5, figure 1-6 illustrates the general distribution of low-income populations within the affected area using data for census block group with low-income populations that exceed the regional threshold of 30 percent. Evaluating low-income populations at this scale would inflate the intensity of impacts; therefore, Inverness CDP has been determined to be the more appropriate scale, and the block group data is provided for informational purposes only.

As stated by DBOC, 22 employees are Hispanic or Latino and most also fall into the category of low-income (DBOC 2011i¹). However, under the applicable thresholds and as described above, the employees themselves do not constitute a low-income or minority population.

The second factor identified in the Executive Order does not apply here because the public health impacts from this project are remote and negligible. For example, NPS considered air quality as an impact topic in the EIS but dismissed it from further consideration when it determined that emissions from the alternatives would be below the “de minimis” thresholds for San Francisco Bay Area nonattainment areas (pages 41-42, above).





Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

**FIGURE 1-6
Low Income Areas within Marin County**

Pursuant to the third factor, NPS recognizes that there are some cultural, social, occupational, historical, or economic factors that may amplify environmental impacts of the project, such as current economic conditions. However, because the impacts to minority and low-income populations would be limited to DBOC employees and not surrounding minority populations, this is not a relevant factor for environmental justice consideration. However, where applicable, these factors are considered as part of the cumulative impact analysis for Socioeconomic Resources in chapter 4.

In accordance with the fourth factor, NPS encouraged public participation throughout the NEPA process. The public scoping period was open between October 8, 2010 and November 26, 2010. The Draft EIS was made available for public review and comment beginning on September 23, 2011 and ending December 9, 2011. Both of these comment periods were extended beyond the standard 30 and 60 days, respectively, to accommodate any interested parties who may have been adversely affected by a power outage in 2010 that disrupted the NPS PEPC system, and in 2011 to consider additional comments in light of the Marine Mammal Commission's November 2011 report (MMC 2011b). Comments were accepted online, in park forms available at the public meetings, as well as by mail. NPS also held three public scoping meetings in 2010 and three public meetings in 2011 during the public review of the Draft EIS. NPS included Spanish-language interpreters at all public meetings to accommodate parties of limited-English, and the fact sheet available at the 2011 public meetings was also available in Spanish.

As noted previously, because potentially disproportionate impacts to minority and low-income populations would be limited to DBOC employees, the fifth environmental justice factor identified in Executive Order 12898 is not relevant to the proposed action. However, as explained under the fourth factor, NPS provided public participation opportunities that were available to interested parties who individually qualify as low-income or minority.

Sixth, NPS consulted with The Federated Indians of Graton Rancheria inviting the tribe to provide information on features of cultural or religious significance. The correspondence is provided in appendix D of the Final EIS.

Based on the information provided above, the impact topic of environmental justice is considered but dismissed from further analysis in the EIS. As noted previously, impacts of the proposed action on DBOC employees is evaluated in the socioeconomic resources sections of this EIS.

RELATED LAWS, POLICIES, AND PLANS

The following section describes various laws, policies, and plans that have informed this EIS and the alternatives considered herein. The alternatives proposed in this EIS exist within a unique legal framework because of the interplay between section 124 of the Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010 (PL 111-88, section 124, 123 Stat. 2904 [2009]), on the one hand, and the numerous laws and policies that normally guide NPS decision making, on the other.

Section 124 vests the Secretary with discretion in the decision as to whether to issue a permit, because the phrase "is authorized" is permissive rather than prescriptive. The legislative history of section 124 confirms this interpretation. When the bill was reported out of the Senate Appropriations Committee, it provided that "the Secretary of the Interior *shall* extend the existing authorization [to Drakes Bay Oyster Company]"

(emphasis added) (see Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010, H.R. 2996, 111th Congress, section 120 [as reported by Senate Committee on Appropriations, July 7, 2009]). This provision was later amended on the Senate floor, and the mandatory language was changed to the current discretionary language (see 155 Congressional Record Section 9769 [September 24, 2009]). The House Conference Report on the final bill summarizes the amendment from the Senate, explaining that it “*modifie[d] language* included by the Senate providing the Secretary *discretion* to issue a special use permit” (emphasis added) (H.R. Report No. 111-316, at 107 [2009] [Conference Report]).

Although the Secretary’s authority under section 124 is “notwithstanding any other provision of law,” the Department has determined that it is helpful to generally follow the procedures of NEPA. The EIS will provide decision-makers with sufficient information on potential environmental impacts, within the context of law and policy, to make an informed decision on whether or not to issue a new SUP. Below are the primary laws that are being considered for this analysis.

OTHER PROVISIONS OF SECTION 124

There are two other provisions of section 124 that apply should a new 10-year permit be issued to DBOC. First, section 124 requires that the United States receive annual payments based on the “fair market value” of DBOC’s use of the federal property for this new 10-year period. The DOI Office of Valuation Services has conducted an appraisal to determine the fair market rental value of the use of the federal property. By terminating the state water bottom lease, DBOC would avoid any obligation to make lease payments to the state. Second, the terms and conditions of the existing authorizations for DBOC may be modified after considering the recommendations of the NAS report. This EIS identifies, where appropriate, possible changes to permit terms.

RELEVANT FEDERAL LAWS AND POLICIES

National Park Service Organic Act

In the NPS Organic Act of 1916 (Organic Act), Congress created the NPS and directed it to manage units of the national park system, “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 U.S.C. 1). The 1978 Redwood Amendment reiterates this mandate by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 U.S.C. 1a-1). The legislative history of the Redwood Amendment further clarified that all units of the national park system, whether designated as parks, recreation areas, seashores, or lakeshores, were to be managed to the same high standard unless Congress specifically provided otherwise.

Although the Organic Act and the Redwood Amendment use different wording (“unimpaired” and “derogation”) to describe what NPS must avoid, both acts define a single standard for the management of the national park system—not two different standards. For simplicity, *NPS Management Policies 2006* uses “impairment,” not both statutory phrases, to refer to that single standard.

Based on its authority under the Organic Act, the NPS has promulgated a series of regulations contained in title 36 of the Code of Federal Regulations (CFR). The provisions in title 36 provide a comprehensive suite of regulations that govern activities within units of the national park system.

Wilderness Act of 1964, Point Reyes Wilderness Act of 1976, and Directors Order 41: Wilderness Preservation and Management

The Wilderness Act establishes the national wilderness preservation system, consisting of federal lands designated by Congress as wilderness. Wilderness is defined as “an area where earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” An area of wilderness is further defined as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation which is protected and managed so as to preserve its natural conditions” (16 U.S.C. 1132).

According to section 4(c) of the Wilderness Act, there shall be no commercial enterprise and no permanent road within any wilderness area and, except as necessary to meet minimum requirements for the administration of the area (including measures required in emergencies involving the health and safety of people within the area), there shall be no temporary road; no use of motor vehicles, motorized equipment, or motorboats; no landing of aircraft; no other form of mechanical transport; and no structure or installation within any such area.

In the Point Reyes Wilderness Act of 1976, Congress designated the waters within Drakes Estero (approximately 1,363 acres within the project area) as “potential wilderness.” Drakes Estero was designated as potential wilderness rather than full wilderness due to the presence of the commercial oyster operation, a nonconforming use. The House Committee Report accompanying the 1976 Point Reyes Wilderness Act states: “As is well established, it is the intention that those . . . waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status” (H. Rep. No. 94-1680 [1976]).

In 2004, the Solicitor’s Office issued an opinion interpreting the 1976 Point Reyes Wilderness Act. Based on the language of the law and its legislative history, the opinion concluded that NPS was mandated to convert the potential wilderness in Drakes Estero to full wilderness as soon as the nonconforming use could be eliminated. The oyster operation in Drakes Estero was dependent on the 40-year RUO that Charles Johnson had retained when he sold his 5-acre parcel to the NPS in 1972. The RUO expires on November 30, 2012, making this date the earliest date on which the nonconforming use would cease. In order to affect Congress’s intent that Drakes Estero be converted to full wilderness, the Solicitor’s Office advised the NPS that it lacked discretion to allow the oyster operation to continue beyond November 30, 2012.

Section 124 now gives the Secretary the discretion to issue a 10 year permit notwithstanding the 1976 Point Reyes Wilderness Act.

Endangered Species Act

Under section 7 of the Endangered Species Act of 1973, as amended, the NPS is required to coordinate with the USFWS and NMFS to ensure that its actions affecting federally listed species do not jeopardize their continued existence or result in the destruction or adverse modification of their critical habitat. Consultation is required whenever such species or habitat may be affected by a proposed project. Through the consultation process, the agencies develop a biological opinion setting forth their assessment of the impact of the project on listed species and on any critical habitat that may exist within the area of effect. The biological opinion may contain conservation recommendations and reasonable and prudent measures for the agency or applicant to follow.

Several federally designated threatened and endangered species and/or their critical habitat exist in the project area. As described in the special status species section of this EIS, NPS has determined that some of the actions proposed in this EIS have the potential to impact these listed species and/or their critical habitat. In order to fully understand the possible effects of the actions proposed in this EIS on listed species and their critical habitat, the NPS has initiated consultation with the USFWS and NMFS.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 implements several treaties protecting birds that migrate across national borders. MBTA makes it unlawful to take, possess, or sell protected species, or any product or parts thereof (eggs, nests, feathers, plumes, etc.), except as permitted by the Secretary. Take is defined as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.” It does not necessarily include destruction or alteration of habitat, unless there is a direct taking of birds, nests, eggs, or other such parts. All waterfowl, shorebirds, hawks, owls, eagles, native doves and pigeons, swifts, common native songbirds, and other species are protected under the act. A complete list of protected species is found at 50 CFR 10.13. Several species of migratory birds, such as the brant goose, have been identified within the project area.

NPS Management Policies 2006

NPS *Management Policies 2006* (NPS 2006d) sets the framework and provides the direction for actions of the NPS. Adherence to policies is mandatory unless allowed by enabling legislation, or waived or modified by the Secretary, Assistant Secretary, or the Director, or if a law directly and specifically directs an action contrary to NPS policy. *Management Policies 2006* also contains guidance applicable to the alternatives contained in this document.

This EIS assesses the effects of the alternatives on park resources and values and provides information used in determining if these effects would cause impairment or unacceptable impacts. NPS *Management Policies 2006* require an analysis of potential effects to determine whether or not actions would impair park resources (NPS 2006d). To assess the impacts of the proposed action, policies relating to resource protection were considered during EIS preparation, including biological resource management (4.4), native plants and animals (section 4.4.2), water quality (section 4.6.3), floodplains (section 4.6.4), wetlands (section 4.6.5), protection of geologic processes (section 4.8.1), soundscape management

(section 4.9), protection and preservation of cultural resources (section 5.3.1), treatment of cultural resources (section 5.3.5), wilderness resource management (section 6.3), and wilderness use management (section 6.4). For example, NPS *Management Policies 2006* instructs park units to maintain, as parts of the natural ecosystems of parks, all plants and animals native to the park ecosystems, in part by minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them (NPS 2006d, section 4.4.1). NPS *Management Policies 2006* direct park units to determine all management actions for the protection and perpetuation of federally, state-, or locally listed species through the park management planning process, and to include consultation with lead federal and state agencies as appropriate.

NPS *Management Policies 2006*, section 1.4.7.1 also apply a standard that avoids impacts it determines to be unacceptable. Managers must not allow uses that would cause unacceptable impacts, such as those which “impede the attainment of a park’s desired future condition for natural and cultural resources.” Furthermore, section 1.4.3.1 of NPS *Management Policies 2006* gives park managers the authority to manage and regulate uses to ensure that impacts from the uses are acceptable (NPS 2006d).

Potential wilderness is congressionally designated and the management policies starting with 6.3 and beyond address management of designated wilderness. Pursuant to NPS *Management Policies 2006* section 6.3.1, the NPS will take no action to diminish potential wilderness qualities and will ensure that potential wilderness is “managed as wilderness to the extent that existing nonconforming conditions allow.” Section 6.3.1 also directs the NPS to “apply the principles of civic engagement and cooperative conservation as it determines the most appropriate means of removing the temporary, nonconforming conditions that preclude wilderness designation from potential wilderness. All management decisions affecting wilderness will further apply the concept of ‘minimum requirement’ for the administration of the area regardless of wilderness category” (NPS 2006d, section 6.3.1).

National Historic Preservation Act

The NHPA, as amended, is legislation intended to preserve historical and archaeological sites. The act created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices (SHPO). Under Section 106 of the NHPA and implementing regulations 36 CFR 800, federal agencies must take into account the effects of their undertakings on significant historic properties and afford SHPO and the Advisory Council on Historic Preservation an opportunity to comment as appropriate. The agency must seek ways to avoid, minimize or mitigate any adverse effects on historic properties. Historic properties include districts, sites (both historic and prehistoric), buildings, structures, and objects that are included in or eligible for inclusion in the National Register. For a discussion of NHPA applicability to this EIS, see the “Cultural Resources” section above under “Issues and Impact Topics Considered but Dismissed.”

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 establishes a national policy to prevent marine mammal populations from declining and to protect marine mammals. Under MMPA, the Secretary of Commerce has the responsibility to protect cetaceans (whales, porpoises, and dolphins) and pinnipeds

(seals and sea lions) except walruses. Section 101(a)(5)(A–D) of MMPA prohibits, with certain exceptions, the taking of marine mammals in the waters of the United States and on the high seas. Congress defines “take” as “harass, hunt, capture, or attempt to harass, hunt, capture or kill any marine mammal.” In 1986, Congress amended MMPA to authorize takings of depleted stocks of marine mammals, again provided that the number of mammals taken (killed, injured, or harassed) was small and the taking had a negligible impact on marine mammals. In 1994, MMPA section 101(a)(5) was further amended to establish an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by “harassment” pursuant to Incidental Harassment Authorizations. The term harassment means, “any act of pursuit, torment, or annoyance that (i) has the potential to injure a marine mammal or marine mammal stock in the wild; or (ii) has the potential to disturb...by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding, or shelter” (16 U.S.C.1362[18]).

Coastal Zone Management Act

Congress passed the Coastal Zone Management Act (CZMA) in 1972 to “preserve, protect, develop, and where possible, restore and enhance the resources of the nation’s coastal zone.” The act encourages coastal states to develop and implement comprehensive programs to manage and balance competing coastal resource uses (e.g., balancing resource protection with economic growth and development). CZMA allows states with approved plans to review federal actions that have a reasonably foreseeable effect on any land or water use or natural resources of the state’s coastal zone. The CZMA provides states with the ability to review federal activities and federally permitted activities, and ensure that such activities are consistent, to the maximum extent practicable, with their coastal zone management plans. The processes used to implement this requirement are called “consistency determinations” and “consistency certifications.” If a proposed action is inconsistent with the requirements of the state’s approved program, the applicant and federal agency are prohibited from conducting the activity unless certain significant additional procedures are followed.

The NOAA Office of Ocean and Coastal Resource Management (OCRM) oversees the state implementation of CZMA. At the state level, CCC implements the CZMA as it applies to federal activities, development projects, permits, and licenses within the project area. CZMA consistency certifications are reviewed in accordance with the California Coastal Act and the state’s coastal plan. CCC made a request to NOAA-OCRM to review the new DBOC SUP application. NOAA-OCRM granted the request because it determined that the activity had the potential to have a “foreseeable effect” on coastal resources (NOAA-OCRM 2011b). Furthermore, NOAA-OCRM determined that DBOC must prepare and submit to CCC a certification that the activities undertaken will be conducted in a consistent fashion with the federally approved enforceable policies of the California Coastal Management Program. This would include submission of necessary data and information, as required by 15 CFR 930.58. Within their letter to CCC, NOAA-OCRM stated that NPS may not issue an SUP until CCC concurs with the consistency certification or that concurrence is presumed based on a lack of response within regulated timeframes (NOAA-OCRM 2011b).

Clean Water Act

The Clean Water Act of 1972 (33 U.S.C. 1344 et seq.), as amended, is the primary federal law in the United States governing water integrity. The goal of the CWA is to “restore and maintain the chemical, physical, and biological integrity of the nation’s water.” Waters of the United States generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands.

Section 404 of the CWA authorizes USACE to issue permits to project applicants for the “discharge of dredged and/or fill material in waters of the U.S.” and is the primary federal authority for the protection of wetlands. USACE jurisdiction for waters of the United States is based on the definitions and limits contained in 33 CFR 328, which encompasses all navigable waters, their tributaries, and adjacent wetlands, and includes ocean waters within 3 nautical miles of the coastline. Projects involving the discharge of dredged and/or fill material into waters of the United States require authorization from USACE.

Under section 404, USACE has established a nationwide permit (USACE 2007) for existing commercial shellfish aquaculture operations that “authorizes the installation of structures necessary for the continued operation” as well as “discharges of dredged or fill material necessary for shellfish seeding, rearing, cultivating, transplanting, and harvesting activities.” However, the nationwide permit does not apply to new operations or expansions; to cultivation of additional species; to the construction of attendant features such as docks, piers, boat ramps, stockpiles, or staging areas; or to the deposition of shell material into the water as waste (USACE 2007). The purpose of this nationwide permit is to reduce permitting timeframes and simplify continued operation of existing shellfish mariculture projects. State and local authorities may require a separate certification or waiver for authorization of continued operations. It is possible, however, that DBOC would be considered a “new operation” for purposes of permitting, as DBOC does not have an existing permit.

Projects resulting in discharges of dredged or fill material into waters of the United States must comply with the guidelines promulgated by the Administrator of the Environmental Protection Agency (EPA) under section 404(b) of the CWA (33 U.S.C. 1344[b]). Under these guidelines, USACE may only permit discharges of dredged or fill material into waters of the United States that represent the least environmentally damaging practicable alternative, provided that the alternative does not have other significant adverse environmental consequences. Practical alternatives must be presented and evaluated during the permit process so USACE can determine which alternative will have a less adverse impact on aquatic ecosystems. On November 16, 2010, USACE stated that “aquaculture activities are within our jurisdiction and a permit is required” (USACE 2010, see relevant correspondence in appendix D). USACE also reiterated the need for DBOC to obtain a permit for impacts on waters of the U.S., including wetlands, vegetated shallows, and open waters pursuant to section 404 of the CWA in their comment letter on the Draft EIS (USACE 2011a, see relevant correspondence in appendix D). It would be the responsibility of DBOC to obtain all relevant permits.

Section 401 of the CWA requires that any applicant for a section 404 permit also obtain a water quality certification from the state. The purpose of the certification is to confirm that the discharge of fill materials will comply with the state’s applicable water quality standards. Section 401 gives the authority to the State of California either to concur with USACE approval of a section 404 permit or to place special conditions on the approval, or deny the activity by not issuing a 401 certification. States were granted this authority to ensure that federally approved projects are in the best interests of the state. The

section 404 permit is not valid without a section 401 certification or waiver of the certification by the state. The 401 certification also applies to any application for a federal license or permit that might result in discharge of any type, including gray-water disposal, into waters of the United States. Section 401 certifications are issued by the San Francisco Bay Regional Water Quality Control Board.

Routine operations associated with DBOC commercial shellfish operations, such as the placement of oyster racks on the floor of Drakes Estero, placement of culture bags near the surface, and discharge of wash from the operations into Drakes Estero, may require both a section 404 permit and section 401 certification. DBOC also proposes to dredge the area around the boat ramp. Section 124 of PL 111-88 does not relieve DBOC of its obligations to comply with the Clean Water Act.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. 403 et seq.) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work is approved by USACE. On November 16, 2010, USACE stated that, “aquaculture activities are within our jurisdiction and a permit is required” (USACE 2010, see relevant correspondence in appendix D). USACE also reiterated the need for DBOC to obtain a permit for impacts on waters of the U.S., including wetlands, vegetated shallows, and open waters pursuant to section 10 of the Rivers and Harbors Act in their comment letter on the Draft EIS (USACE 2011a, see relevant correspondence in appendix D). The Rivers and Harbors Act also requires section 401 certification from the state (as described above). It would be the responsibility of DBOC to obtain all relevant permits.

RELEVANT STATE LAWS AND POLICIES

California Coastal Act

This state law regulates all state and private actions affecting the California coastal zone. As discussed above, CCC is the state agency responsible for CZMA determinations. The regulatory authority also extends to federal actions affecting the coastal zone, as the California Coastal Act is part of the NOAA-approved California Coastal Management Program under the CZMA. The California Coastal Act addresses issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works.

The California Coastal Act also imposes obligations on entities that conduct commercial businesses in the state’s coastal zone. DBOC’s commercial shellfish operation is located in the state coastal zone and is thus subject to CCC oversight and permitting requirements. CCC has issued two Cease and Desist Orders regarding the shellfish operation, one in 2003 to JOC and one in 2007 to DBOC (CCC 2003, 2007b). The 2003 Cease and Desist Order (No. CCC-03-CD-12) to JOC required the removal of some unpermitted development from the property (the shucking room and the retail counter, two houses, and two of the four

mobile homes), improvement of the wastewater system (which was draining into Drakes Estero), remediation related to the storage of oyster cultivation equipment and disposal of refuse in Drakes Estero and along the shore, and the submittal of a coastal development permit application for after-the-fact authorization for other unpermitted development that included construction of several commercial buildings and a horse paddock; additions to pre-Coastal Act buildings; and permanent placement of a mobile home, three metal storage/refrigeration containers, and an aboveground diesel fuel tank and concrete containment structure (CCC 2003).

When DBOC purchased the assets of JOC, it also assumed the compliance obligations arising from the CCC Consent Cease and Desist Order issued to JOC (CCC 2003). In 2005 and 2006, DBOC removed some of the unpermitted development identified in the 2003 Cease and Desist Order, including the removal of the western portion and the second-floor addition to the processing plant and retail facility, two storage containers, a refrigerated trailer, the seed setting area, the western portion of the storage facility, and a mobile home. However, not all of the unpermitted development had been removed when DBOC completed additional development without a coastal development permit, including placement of two large containers for shucking/packing/storage and a temporary construction trailer, construction of a processing facility and second leach field, grading and paving within the onshore portions, and placement of oyster culture apparatus (seed setting tanks and water intake) in Drakes Estero (CCC 2007b). DBOC also established unauthorized practices on the property (e.g., boat transit outside established channels). Between 2005 and 2007, CCC alerted DBOC to these violations, and DBOC agreed to submit a coastal development permit application for all “onshore and offshore” development on the property that required a permit.

A second Consent Cease and Desist Order (No. CCC-07-CD-11/CCC-07-CD-04) was issued as a short-term order to allow DBOC operations to continue while DBOC met the remaining requirements for documented violations. The 2007 Cease and Desist Order set time frames for submittal of the coastal development permit application, established agreed-upon conditions of the operations, and identified activities to be avoided until CCC received and approved the application. The consent order furthermore directed DBOC to take actions and implement protective measures to ensure protection of coastal resources. These protective measures included the following conditions:

- Onshore Conditions (Section 3.1)
 - additional structures prohibited pending CDP or de minimis waiver
 - submittal of a hazardous materials/discharge management plan
 - maximum temperature of released water must be less than 20 degrees more than receiving waters; seawater intake structures shall not exceed an intake velocity of 0.5 ft/s
- Offshore conditions (Section 3.2)
 - additional structures prohibited pending CDP
 - removal of equipment not being used within 30 days (including permanent structures such as racks)
 - submittal of a debris removal plan to NPS and CCC
 - import shellfish in the form of larvae or seed, certified by CDFG to be free of pathogens
 - boat transit limited to established channels that do not violate the protective measures set forth in the consent order. Submit a vessel transit plan to NPS and CCC. Include proposed access lanes (distinguishing between commonly used channels and channels only used when

- certain racks/bags are active) and mooring areas for maintenance and harvesting of oysters, clams, and scallops.
- maintain the harbor seal protection areas as incorporated into SUP
 - remove any Pacific and European flat oysters outside the approved cultivation areas
 - clams and scallops shall only occur where currently cultivated and no additional non-oyster species shall be cultivated
 - bottom bags shall only be placed in intertidal areas devoid of eelgrass
 - provide documentation of “current production level” (including last year and next year’s projection); the maximum annual production limit shall be capped at this level
 - cultivation area defined as areas that are included in the current CDFG leases; consistent with CDH, FDA, and National Shellfish Sanitation Program; and specified as oyster beds or primary water quality sites

On November 29, 2007, DBOC signed the consent order to work with CCC and NPS to resolve the violations (CCC 2007b). Even though the 2007 Cease and Desist Order was issued as a short-term order, it currently remains in effect.

On September 29, 2011, CCC notified DBOC regarding potential noncompliance with several of the stipulations in the 2007 Consent Cease and Desist Order: “1) marine debris in Drakes Estero and on nearby coastal beaches, especially from abandoned, discarded, or fugitive plastic aquaculture materials; and 2) motorized vessel transit in the lateral sandbar channel near the mouth of the Estero during the seasonal restriction period established for harbor seal pupping sites in this area” (CCC 2011). CCC reaffirmed these continued violations and requested additional information from and meetings with DBOC in a subsequent letter on February 1, 2012 (CCC 2012a^{li}).

On February 17, 2012, DBOC submitted an updated coastal development permit application to CCC for review and approval to resolve some of the violations cited in the orders (DBOC 2012a^{liii}). In addition to previously requested items in the 2010 application, the current application includes portions of the work approved as part of the emergency storm repair of the damage caused in March 2011 and a request for 12 barbecue grills and 6 additional picnic tables. CCC informed DBOC on March 16, 2012 that this coastal development permit application was “incomplete because there is no evidence of landowner approval of the proposed work, a portion of the permit fee has not been submitted, and you [DBOC] have not provided sufficient detail regarding the additional work” (CCC 2012d). DBOC informed NPS in a letter dated May 7, 2012 that it would limit its current coastal development permit application to existing activities and would apply to CCC for a coastal development permit amendment in the future prior to future development (DBOC 2012d^{liiii}). DBOC also responded to the NPS’s previous request for additional information related to consistency with the SUP and provided an updated project description.

In a letter dated July 30, 2012, CCC informed DBOC of its continued noncompliance with several of the stipulations in the 2007 Consent Cease and Desist Order, including unauthorized boat use of the lateral channel during the seasonal closure for harbor seal pupping, unauthorized boat use of the lateral channel to obtain water sampling data, the collection and disposal of marine debris as a result of JOC and DBOC operations, and development within the coastal zone without an approved coastal development permit. CCC notified DBOC that a new Cease and Desist Order is being considered, “Considering the current uncertainty of a new lease and SUP permit being granted to DBOC, the delays in the various proceedings,

your [DBOC] apparent confusion over certain terms of the Order, and the continuing difficulties in bringing DBOC operations into compliance with the Coastal Act” (CCC 2012b). On October 24, 2012, CCC notified DBOC that CCC was commencing proceedings for issuance of cease and desist and restoration orders (CCC 2012e^{liv}). The letter summarized the violation as follows:

As you know, your facility remains unpermitted under the Coastal Act; the 2007 Order was intended to provide a short-term means to protect coastal resources while such a permit was being sought, but in no way purported to authorize the facility under the Coastal Act, nor serve as a long term solution. In addition, unpermitted development since the 2007 order has occurred and includes, but may not be limited to: (1) operation of boats in the lateral channel (From footnote in letter: Defined as “the entire channel between the Main Channel and West Channel” in correspondence from the National Park Service to DBOC dated January 23, 2012) in violation [of] the National Park Service (NPS) Special Use Permit (SUP) issued in April, 2008, and therefore additionally in violation of Section 7.0 of the 2007 Order, which specifically anticipates and requires compliance with all permits; (2) unpermitted discharge of marine debris in the form of abandoned, discarded, or fugitive mariculture materials in violation of Section 3.2.2 of the 2007 Order, which requires removal of abandoned equipment, and Section 1.0(c) of Cease and Desist Order No. CCC-03-CD-12 (the ‘Johnson Order’), which mandates a removal plan to address submerged oyster cultivation equipment and materials in the estuary; and (3) new unpermitted development, including but not limited to, construction and backfill of a 12” by 18” by 80’ long electrical trench, placement and removal of clam cultivation bags within a harbor seal protection area and associated vessel use and worker operations, placement of three 4’ diameter concrete planters, removal and replacement of six picnic tables and placement of six additional picnic tables and installation of an 8’ by 40’ refrigeration unit within the last month, in violation of Sections 2.0, 3.1.2 and 3.2.1 of the 2007 Order, which expressly prohibit the performance of any new development including onshore or offshore structures, without some sort of Coastal Act authorization. (CCC 2012e)

Coordination between CCC and DBOC is ongoing to resolve the remaining violations.

Section 124 of PL 111-88 does not relieve DBOC of its legal obligations under the California Coastal Act.

California Fish and Game Code

Under the California Fish and Game Code, the California legislature authorizes CFGC to issue state water bottom leases for marine aquaculture on state-owned tide and submerged lands. CDFG administers such leases. Leases are granted for up to a 25-year period and are subject to renewal if the lessees remain “actively engaged” in aquaculture. Currently, commercial marine aquaculture is limited to oysters, abalone, clams, mussels, algae, kelp, scallops, and finfish.

The tide and submerged lands within Drakes Estero were conveyed by the State of California to the United States in 1965 and do not constitute state-owned tide or submerged lands for the purposes of state water bottom leasing. In the conveyance statute, the state retained certain mineral rights in the submerged

lands, but the state did not retain the right to issue aquaculture leases. The state also retained, on behalf of the people, the right to fish. However, as explained earlier in this chapter, the right to fish does not encompass commercial aquaculture like that practiced by DBOC.

Although the leasing provisions of the Fish and Game Code do not apply to DBOC, other provisions of the code do apply. These include provisions related to stocking of aquatic organisms (sections 15200-15202), brood stock acquisition (sections 15300-15301), disease control (sections 15500-15516), aquaculture registration for all operators (sections 15100-15105), and the importation of aquatic animals (sections 15600-15605). CDFG coordinates disease and health certification for shellfish with other agencies. Section 124 of PL 111-88 does not relieve DBOC of its obligations to comply with these state law requirements.

California Marine Life Protection Act

This state law directs the reevaluation and redesign of California's system of marine protected areas (MPAs) to increase coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational, and study opportunities provided by marine ecosystems subject to minimal human disturbance. The establishment of a combination of state marine reserves, state marine conservation areas, and state marine parks helps achieve these goals. The Marine Life Protection Act (MLPA) also requires that the best readily available science be used in the redesign process, as well as the advice and assistance of scientists, resource managers, experts, stakeholders, and members of the public. This process was recently completed for the North Central Coast Study Region, including the Seashore, and resulted in the designation of MPAs within and adjacent to Drakes Estero. Point Reyes Headlands to the west of the project area and Estero de Limantour to the southeast have been designated as state marine reserves where the take of all living marine resources is prohibited. Drakes Estero is identified as a state marine conservation area where take of all living marine resources is prohibited, except for (1) recreational take of clams and (2) commercial aquaculture of shellfish pursuant to a valid state water bottom lease and permit. The Fish and Game Code definition of take is "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." This is slightly different than the definition used by the MMPA (see the section entitled "Marine Mammal Protection Act"). Due to the proximity of the proposed action to the MPAs, the MLPA was considered during preparation of this EIS.

Section 124 of PL 111-88 does not relieve DBOC of its obligations to comply with the California Marine Life Protection Act.

California Health and Safety Code and Other State Requirements

Shellfish cultivated under the provisions of an aquaculture registration may only be grown, processed, and marketed for human consumption under the California Health and Safety Code and other California statutes and regulations, including the California Shellfish Law (California Health and Safety Code sections 28500-28519.5) and Shellfish Regulations (California Code Regulations 17 sections 7706-7761). Section 124 of PL 111-88 does not relieve DBOC of its obligations to comply with these state law requirements. The public health code requirements are monitored and enforced by the California Department of Public Health.

RELEVANT FEDERAL EXECUTIVE ORDERS

Executive Order 11990: Protection of Wetlands

This executive order directs federal agencies to avoid, to the extent possible, the long-term and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. A fundamental element of this executive order is the adoption of a “no net loss of wetlands” goal, which the NPS wetlands policy was derived from. In addition, the NPS will strive to achieve a longer-term goal of net gain of wetlands Service-wide (NPS 2006d).

Executive Order 11988: Floodplain Management

This executive order directs federal agencies to avoid, to the extent possible, the long-term and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

Executive Order 13112: Invasive Species

This executive order directs federal agencies to avoid, to the extent possible, authorizing, funding, or carrying out actions that it believes are likely to cause or promote the introduction or spread of invasive species.

Executive Order 13158: Marine Protected Areas

This executive order directs federal agencies to take appropriate actions to enhance or expand protection of existing Marine Protected Areas (MPAs) and establish or recommend, as appropriate, new MPAs. On April 23, 2009, NOAA published in the Federal Register the initial list of national system MPAs. A total of 225 sites were designated, including Point Reyes National Park [Seashore], which includes Drakes Estero (NOAA 2009). Since then, an additional 72 sites have been listed as part of the national system MPA, including the Drakes Estero State Marine Conservation Area (NOAA 2011b).

Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds

This executive order directs executive departments and agencies to take certain actions to further implement the MBTA.

Executive Order 12898: General Actions to Address Environmental Justice in Minority Populations and Low-income Populations

This executive order requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental impacts of their programs and policies on minorities and low-income populations and communities (EPA 1994).

RELATIONSHIP TO OTHER PLANS AND DOCUMENTS

Point Reyes National Seashore, General Management Plan (1980)

The primary purpose of a GMP is to provide vision for a park that will guide how the park's lands and waters are managed over a 15- to 20-year period. The most recent GMP for the Seashore was completed in 1980 (NPS 1980). Because resource management needs and goals evolve, this document is outdated, and the Seashore is in the process of developing a new GMP. Nevertheless, the 1980 plan provides some general background guidance applicable to actions considered in this EIS.

The GMP divides the Seashore into separate land management zones, with an emphasis on natural resource protection. Management objectives are defined for each zone that clearly convey the direction for resource preservation and visitor use. Approximately two-thirds of the Seashore's acreage is assigned to the natural zone, which includes subzones of wilderness and research reserves (marine life preservation areas established to protect and study aquatic wildlife). The majority of Drakes Estero falls within the wilderness classification through its congressionally designated potential wilderness status. Additional lands within the Seashore have been classified into four special use zones, including "pastoral lands," "radio range station," "oyster farm," and "lands not to be acquired." The onshore property used as part of the commercial shellfish operation is designated as the "oyster farm" subzone consisting of 5 acres on the upper end of Drakes Estero. Additionally, lease boundaries are delineated in Drakes Estero where oysters are cultivated and harvested. Overall, the plan limits the development zone used for roads and parking, administration facilities, and minor facilities.

The 1980 GMP contains several natural resource objectives that have influenced management of the resources within the Seashore and at Drakes Estero and that will guide the analysis in this EIS. These objectives include:

- To protect marine mammals, threatened and endangered species, and other sensitive natural resources found within the Seashore
- To preserve and manage as wilderness those lands so designated under PL 94-567 and to also manage as wilderness to the extent possible those tide and submerged lands designated as potential wilderness
- To monitor and improve maricultural operations, in particular the oyster mariculture operation in Drakes Estero, in cooperation with the California Department of Fish and Game
- To enhance knowledge and expertise of the ecosystem management through research and experimental programs (NPS 1980)

With its mandate to care for and administer these lands in a way that safeguards their natural character, and knowing that the RUO for the onshore portion of the oyster operation did not expire for another 32 years (until 2012), the NPS's decision to monitor and improve the oyster operation in a manner consistent with NPS mandates was an appropriate goal for the anticipated lifespan of the GMP. Rehabilitation of existing structures, improvements to the drainage system and leach fields, and the addition of screening fences were all undertaken. Monitoring activities have been conducted within Drakes Estero relative to various marine species to identify habitat areas and current trends.

Environmental Assessment Johnson Oyster Company

In 1998, an EA was prepared by NPS to bring JOC into compliance with federal, state, and Marin County regulations (NPS 1998a). The EA was prepared to allow JOC to address an unpermitted discharge into Drakes Estero from a failed JOC septic system. Consistent with the 1980 GMP, which envisioned that NPS would monitor and improve the commercial shellfish operation in a manner consistent with then-existing NPS mandates during the anticipated lifespan of the GMP, and because of the need to address this unpermitted discharge, the NPS worked with JOC and Marin County to permit upgrades to the septic system. JOC also proposed the construction of a new oyster processing plant and the replacement and rehabilitation of several additional structures and infrastructure, including the seed plant, stringing plant, garage, and septic system. NPS approved these actions in a Finding of No Significant Impact (FONSI) dated August 11, 1998 (NPS 1998b). The FONSI also included an annual processing/production limit of 700,000 pounds (oyster weight) to ensure that the new facilities would not create additional growth (and any new negative impacts) in overall oyster production in the estuary (NPS 1998b). The only actions that JOC completed were removal of some mobile homes from the site and installation of a single leach field, which corrected the unpermitted discharge.

While some progress was made by JOC in bringing facilities into compliance, there were still numerous California Coastal Act, county building code, and NPS permit violations left unresolved (Caywood and Hagen 2011). In 2003, CCC issued a Cease and Desist Order (No. CCC-03-CD-12) to JOC that required the removal of some unpermitted development from the property, improvement of the wastewater system, and the submittal of a coastal development permit application for after-the-fact authorization for other unpermitted development (CCC 2003). Due to these unresolved violations, in September 2003 NPS revoked authority for the construction and replacement activities that had been authorized by the 1998 EA and FONSI (NPS 2003c^{lv}).

Actions considered in the 1998 NEPA process that had not been completed prior to the NPS's revocation of the FONSI in 2003 are being reviewed in this EIS in accordance with existing NPS policies and procedures.

Statement of Principles

In April 2008, in conjunction with the SUP, DBOC and NPS agreed to a statement of principles that outlined procedures to be followed in the event that a NEPA document need to be prepared for proposed activities associated with the remaining 4-year term of the RUO. As indicated by the statement of principles, DBOC was to prepare a "description of their operations for NEPA evaluation" and that NPS would consider

this description in developing the purpose and need for the NEPA document and alternatives to be considered. The statement of principles was executed prior to the enactment of section 124 and prior to the Secretary's decision to conduct a NEPA evaluation of the possible issuance of a permit under section 124. NPS and DBOC have agreed to apply the statement of principles to this EIS to the extent that it is applicable. The statement of principles highlights good faith efforts from both parties to share information and provide timely responses. The statement of principles can be found in appendix C.

Point Reyes National Seashore Comprehensive Interpretive Plan

The *Point Reyes National Seashore Comprehensive Interpretive Plan* (NPS 2003b) presents primary park-wide themes, visitor experience goals, existing interpretive conditions, and future interpretive programs. Interpretive and educational services, including personal services, interpretive media, and partnerships that work to support the delivery of interpretive and educational programs are coordinated with the comprehensive interpretive plan.

Point Reyes National Seashore Strategic Plan

The *Point Reyes National Seashore Strategic Plan for 2005–2008* (NPS 2004e) contains mission statements and long-term goals for the Seashore. Annual plans and implementation strategies have been established for each of the 5-year goals.

Point Reyes National Seashore Resource Management Plan

The resource management plan for the Seashore was updated in December 1999. The plan presents an inventory and description of natural and cultural resources, describes and evaluates the current resources management program, and prescribes an action program based on legislative mandates, NPS policies, and provisions of related planning documents. The resource management objectives are broadly summed up in the vision statement for the Seashore, as illustrated in this excerpt:

Point Reyes National Seashore will be a model of environmental stewardship—a coastal sanctuary where all park staff and the public are actively involved in the common goal of maintaining, protecting, restoring, and preserving the natural and cultural integrity of the park. We will enhance stewardship through research and monitoring programs. We will use this knowledge to promote the natural vitality of a healthy ecosystem, with a resource management program that supports the native species and natural biologic and geologic processes, which occur here. Threatened, endangered, and specially protected species will be given particular attention to ensure they are perpetuated for future generations.

To acknowledge the historic, cultural, and ethnic diversity of the area, resources such as the Point Reyes Lighthouse and other maritime sites and structures, Coast Miwok sites, and cultural landscapes embodied in the historic ranches will be preserved. . . . Point Reyes will be a place where you can visit and experience nature in peaceful solitude as it has existed for thousands of years. (NPS 1999b)

USFWS and NMFS Federally Listed Species Recovery Plans

Section 4 of the ESA requires USFWS and NMFS to develop and implement recovery plans for threatened and endangered species, unless such plans would not promote conservation of the species. Recovery plans are guidance documents intended to delineate reasonable actions that are believed to be required to recover and/or protect listed species. As such, according to the ESA, the recovery plans must at a minimum provide a description of site-specific management actions necessary to achieve recovery of a species; objective, measurable criteria which, once met, would result in a determination that the species be removed from the list; and estimates of the time and cost required to achieve the plan's goal (NMFS 2010d). In addition, section 4 of the ESA requires USFWS and NMFS to conduct status reviews of each listed species at least once every 5 years (called "5-year review"). The purpose of the 5-year review is to evaluate whether or not a species status has changed since it was listed or since the last 5-year review.

Generally, USFWS manages land and freshwater species, whereas NMFS manages marine and anadromous (i.e., migrating between ocean and freshwater) species. USFWS has recovery plans for Myrtle's silverspot butterfly (USFWS 1998), California red-legged frog (USFWS 2002b), leatherback turtle (NMFS and USFWS 1998), western snowy plover (USFWS 2007), and California least tern (USFWS 1985b). USFWS 5-year reviews are available or in progress for all of these species.

NMFS recovery planning follows NMFS interim recovery planning guidance, which was established in July 2006. This guidance, in addition to status reviews conducted by NMFS, has led to several recent recovery documents for salmon and steelhead species in multiple regions. Recovery of the central California coast Coho salmon is outlined in the draft central California coast Coho salmon recovery plan (NMFS 2010b), which is in the approval process. Recovery of the central California coast Steelhead is described in the *Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead* (NMFS 2011e). This is a NMFS pre-planning document to facilitate development of a draft recovery plan.

ENDNOTES

i. CSLC 2007, Letter from Executive Officer, California State Lands Commission, to Alliance for Local Sustainable Agriculture, on July 26, 2007, regarding a review of the state land conveyances and jurisdictions.

"We have reviewed land conveyances made by the Office of the Surveyor General and the Legislature as they pertain to the tide and submerged lands of the Estero and have concluded that they have conveyed out all of the State's real property interest except the mineral estate. This leaves the Commission with no jurisdiction over the bed of the Estero and precludes us from taking any action.

ii. CDFG 2007b, Letter from Director, California Department of Fish and Game, to Superintendent Point Reyes National Seashore, May 15, 2007, regarding Drakes Bay Oyster Company lease status.

"Consistent with article 1, section 25 of the California Constitution, this conveyance carried a reservation of the right to fish in the waters overlying these lands. Although the right to fish extends to both commercial and sports fishing, it does not extend to aquaculture operations. Regardless if its purpose is commercial or recreational, fishing involves the take of public trust resources and is therefore distinct from aquaculture, which is an agricultural activity involving the cultivation and harvest of private property."

iii. CSLC 2007, Letter from Executive Officer, California State Lands Commission, to Alliance for Local Sustainable Agriculture, on July 26, 2007, regarding a review of the state land conveyances and jurisdictions.

"Secondly, we have taken a look at the constitutional 'right to fish' reserved in the 1965 legislative grant. It is our belief that this reservation addresses fishing in the sense of taking or capturing fish and that it does not deal with aquaculture which comes under the jurisdiction of the Department of Fish and Game. It [is] also apparent that the right to fish is not an absolute one and that it is susceptible to reasonable regulation."

iv. DOI 2012a, Letter (with attachments) from Field Solicitor to California Fish and Game Commission Executive Director on May 21, 2012.

"The issue of the State of California's authority to issue aquaculture leases for the water bottoms in Drakes Estero has been addressed by the Department of Fish and Game's Office of General Counsel, by the Executive Officer of the State Lands Commission, and by the Attorney General's Office. All three have reached the same conclusion: that the "right to fish" under the public trust doctrine does not extend to aquaculture or to the leasing of water bottoms in Drakes Estero.

As explained in the March 25, 2008 letter from the Department of Fish and Game (Department), the cultivated products of an aquaculture operation are private property. By contrast, the public's right to fish under the public trust extends only to public resources, such as wild fish and mollusks. Because the shellfish cultivated by DBOC are private property, the public trust doctrine does not authorize the issuance of a state lease for DBOC's private commercial aquaculture operation."

v. CDFG 2007b, Letter from Director, California Department of Fish and Game, to Superintendent Point Reyes National Seashore, May 15, 2007, regarding Drakes Bay Oyster Company lease status.

"For these reasons, we believe the mariculture operation in Drakes Estero is properly within the primary management authority of the PRNS, not the department (CDFG)."

vi. CDFG 2008a, Letter from, California Department of Fish and Game Acting Director, to Honorable Jared Huffman, Assembly Member, March 25, 2008, regarding CDFG position on Drakes Bay Oyster Farm.

“Since both the 1972 grant reservation and the 2004 state water bottom lease renewal require compliance with all rules and regulations of the National Park Service, the Department concluded the “Primary management authority” for the oyster farm lies with the PRNS.”

vii CDFG 2011f, Letter (with attachments) from California Department of Fish and Game to Point Reyes National Seashore on December 22, regarding CDFG’s comments on National Park Service Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit.

“DFG, page 7, Paragraph 2: The CDFG manages 16 shellfish leases held by 8 such operators.”

viii CDFG 2011f, Letter (with attachments) from California Department of Fish and Game to Point Reyes National Seashore on December 22, regarding CDFG’s comments on National Park Service Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit.

“DFG, page 7, Paragraph 3 1st sentence: Does this number include DBOC? If not, there are 9 operations (11 including DBOC). The 19 operations are not all on granted or private tidelands. The rest are private land-based facilities.”

ix. CDFG 2007b, Letter from Director, California Department of Fish and Game, to Superintendent Point Reyes National Seashore, May 15, 2007, regarding Drakes Bay Oyster Company lease status.

“For these reasons, we believe the mariculture operation in Drakes Estero is properly within the primary management authority of the PRNS, not the department (CDFG).”

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xi. DOI 2012a, Letter (with attachments) from Field Solicitor to California Fish and Game Commission Executive Director on May 21, 2012.

“The issue of the State of California’s authority to issue aquaculture leases for the water bottoms in Drakes Estero has been addressed by the Department of Fish and Game’s Office of General Counsel, by the Executive Officer of the State Lands Commission, and by the Attorney General’s Office. All three have reached the same conclusion: that the “right to fish” under the public trust doctrine does not extend to aquaculture or to the leasing of water bottoms in Drakes Estero.

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We would also like to address the Commission’s leasing authority under Fish and Game Code Sections 15400 *et. seq.* These provisions authorize the Commission to lease state water bottoms for aquaculture operations. In 1965, the California Legislature conveyed all of the tide and submerged lands in Drakes Estero to the United States. The only interests reserved by the Legislature were the right to fish (discussed above) and certain mineral rights. As indicated

xiv. Studdert 1993, Letter from Johnsons Oyster Company Legal Council to Director, California Department of Fish and Game, on August 6, 1993, regarding Water Bottom Allotment Lease No. M-438-01 Johnson Oyster Company.

“Johnson Oyster Company would like to start culturing Manila Clams on the captioned lease [Lease No. M-438-01] in Drakes Estero. Accordingly, please consider this a request to add that species, Manila clams (*Venerupis japonica*), to the other species specified at page 4 of the captioned allotment [Lease No. M-438-01] at the top of the page.”

xv. NPS 2003c, Letter from Point Reyes National Seashore Superintendent to Johnson Oyster Company on September 17.

“Finally, we must ensure you realize that you do not have authority or permission to construct any new facilities on the reservation lands or other lands authorized under permits. Regarding any new facilities that were authorized by the completion of the Johnson Oyster Replacement and Rehabilitation Environmental Assessment in 1998, the NPS revokes any authority for construction and replacement activities.”

xvi. CDFG 2004a, Letter from California Department of Fish and Game to Johnson’s Oyster Company, February 2, 2004 regarding application to extend JOC Mariculture Leases M-438-01 and M-438-02.

“2) Lease term- The maximum lease renewal term allowed by the Commission is 25-years. You have expressed the desire to renew your lease for the 25-year maximum allowed by the Commission. However, The Department would require that a federal/National Park Service (NPS) lease be in effect concurrently with the state water bottom lease. Based on information from Don Neubacher, Superintendent, Point Reyes National Seashore, your existing federal lease [RUO] will terminate in 2012. At that time the leased land will revert to wilderness designation and your non-conforming use will not be permitted thereafter. The Department will want language in the lease that limits the lease renewal term to a 25-year maximum, or until the expiration of the federal lease.”

xvii. NPS 2004c, Letter from Superintendent, Point Reyes National Seashore to Director, California Department of Fish and Game, March 15, 2004, regarding legal opinions from the DOI Solicitor's Office about the aquaculture activities of Tom Johnson in Drakes Estero.

"After reading the legal opinions from our Solicitor's Office, we wish to have a meeting with you regarding how to proceed. At this time, we still believe Mr. Johnson will need a permit from the National Park Service to operate in Drakes Estero and additional environmental compliance may be necessary."

xviii. CDFG 2004b, Memorandum from Director, California Department of Fish and Game to Executive Director, California Fish and Game Commission, June 14, 2004 regarding Consent Item 32 on the June 24, 2004 CFGC meeting to extend JOC Mariculture Leases M-438-01 and M-438-02.

"He [Johnson] has also indicated an interest in renewing the leases for the maximum twenty-five (25) year period. The Department supports the renewal of the leases and concurs with the requested twenty-five year renewal period. Johnson Oyster Company has been operating on National Park Service fee land in Point Reyes National Seashore under a 1972 Reservation of Use and Occupancy (Federal Reservation) in which Mr. Johnson, as a condition of his sale to the Park Service, reserved the right to operate an oyster farm for 40 years until 2012. However, there is some uncertainty whether the Federal Reservation will be extended. For this reason, the Department is recommending that the renewed leases be contingent upon there being a Federal Reservation in place."

"The Department recommends approval of the requested lease renewals for a period of twenty-five years, contingent on there being a Federal Reservation for the land use within the Point Reyes National Seashore. The Department recommends the annual rental rate leases take into consideration the financial hardship expressed by Mr. Johnson and be subject to the stipulations discussed above. The Department also recommends that the lease be contingent on Johnson Oyster Company maintaining appropriate Coastal Zone operational practices as specified by the California Coastal Commission and other federal and state regulatory agencies."

xix. NPS 2004d, Letter from Superintendent Point Reyes National Seashore, to the Director, California Department of Fish and Game, June 18, 2004 regarding Consent Item 32 on the June 24, 2004 CFGC meeting to extend JOC Mariculture Leases M-438-01 and M-438-02.

"As we have discussed with representatives from the Department of Fish and Game, the NPS still believes that any activity in the Estero must also be permitted by the NPS. We have also requested clarification on how CEQA requirements are being met by the Department."

xx. DBOC 2011f, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, March 4, 2011, regarding supplemental scoping information.

"Sales agreement between DBOC and JOC (including information on lease holding interests). Attached, please find a copy of the asset purchase agreement between Johnson Oyster Company and the Lunny Family (Attachment 1-A)."

xxi. DBOC 2008c, Letter from Drakes Bay Oyster Company to California Coastal Commission, November 14, 2008, regarding additional documentation required to comply with Consent Cease and Desist Order No. CCC-07-CD-11.

"Kumamoto oysters have been removed from Drakes Estero. They were in Bed #39. Please see Exhibit 8: Letter from the California Fish and Game."

xxii. CDFG 2008b, Letter from Senior Fish Pathologist, California Department of Fish and Game to Drakes Bay Oyster Company on November 14, regarding Removal of Kumamoto oysters from Home Bay, Drakes Estero.

“DBOC and DFG staff searched for and removed all bags of Kumamoto oysters present. The bags were confined to a region approximately 10M in diameter. We removed exactly 20 bags, each with approximately 300 oysters per bag.”

xxiii. NPS 2009d, Letter from Superintendent, Point Reyes National Seashore, to Commissioner, California Coastal Commission, December 8, 2009, regarding expansion of Manila clams in CDFG Lease No. M-438-01.

“Our specific concerns follow: Changes in the current CDFG lease are subject to environmental review and analysis under the National Environmental Policy Act (NEPA), along with the California Environmental Quality Act (CEQA). We believe the expansion of the area from one acre to the entire lease over 1,000 acres where Manila clams can be cultivated is an important change to the current lease and requires environmental review. We also believe that consultation regarding this expansion is required with NOAA Fisheries, California Coastal Commission, Army Corps of Engineers, and US Fish and Wildlife Service. We are concerned about the potential ecological risks that this species may bring to Drakes Estero and native species there. No risk analysis for this species to be introduced has been conducted.

Potential expansion of Manila clams as an invasive species is a major concern. While Manila clams have been introduced and have spread in other estuaries of California, there is currently no evidence to our knowledge that they escaped or invaded Drakes or Limantour Esteros. The national Academy of Sciences noted in their report Shellfish Mariculture in Drakes Estero (NAS 2009) that “the oysters and clams cultured in Drakes Estero are nonnative species that have some risk of establishing self-sustaining populations (p 5)” and further noted that “continued culture of nonnative oysters and clams poses some risk of their eventual naturalization in Drakes Estero and larval spread to other coastal lagoons...”

xxiv. CFGC 2009, State of California Fish and Game Commission Meeting of December 10, 2009 Consent Calendar.

“We wish now to correct that error and add Manila clams to lease M-438-01 as originally requested and remove Manila clam from M-438-02.”

xxv. NPS 2009e, Letter from Point Reyes National Seashore Superintendent, to Drakes Bay Oyster Company, December 22, 2009, regarding cultivation of Manila clams, site development request, and additional information on Manila clams.

“...we acknowledge you have received permission from the California Fish and Game Commission to place Manila clams in Lease M-438-01. As stated in your permit (Article 4bvi), you may not implement any modifications to CDFG leases without prior written approval from the National Park Service. Article 4bvi states:

Permittee will not introduce species of shellfish beyond those described in the existing leases from the CDFG. Permittee may seek to conform and/or modify these leases with the CDFG. Any modifications approved by the CDFG will be considered by Permitter on a case-by-case basis, and Permittee may not implement any such modifications without the prior written approval of the Permitter.

At this time, we would like to request additional information on Manila clam production. Please provide a proposal that includes location and size of growing area, approximate number of bags and clams, seed and history of production, and other details on the production on Manila clams.”

xxvii. CCC 2009b, Letter from California Coastal Commission to Drakes Bay Oyster Company on September 16, regarding compliance with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

“I am writing concerning compliance with the Coastal Commission’s Consent Cease and Desist Order No. CCC-07-CD-11 (the Order), which was issued to Drakes Bay Oyster Company (DBOC) on December 12, 2007. As you know, the Order contains a number of terms and conditions, and it has come to our attention that you are out of compliance with one or more of these terms and conditions, as described below.

Although the circumstances underlying the Fish and Game Commission’s decision regarding the Johnson Oyster Company’s request in 1993 are unclear, it is apparent that you had the opportunity to legally modify DFG lease Oyster Allotment Number M438-01 several years ago. Despite declining to carry out this legal change you have undertaken the cultivation of Manila clams in DFG Oyster Allotment Number M438-01, an area specified in the DFG lease which ‘is for the sole purpose of cultivating Pacific oyster (*Crassostrea gigas*), and European flat oyster (*Ostrea edulis*).’. . . However, until this matter is resolved, you are out of compliance with Sections 3.2.8, 3.2.11, and 7.0 of the Order.”

xxviii. NPS 2009c, Letter from Acting Pacific West Regional Director, to Drakes Bay Oyster Company, December 4, 2009, notice of violation related to placement of Manila clams in harbor seal exclusion area.

“We have tried to reach you several times about bags with clams and/or oysters and other materials which have been placed in the Harbor Seal Protection Area of Drakes Estero and outside the permitted area. We have attached relevant maps from the Special Use Permit as well as a geographic referenced photograph regarding the violation (See attachments).

This letter serves as a notice of violation by Drakes Bay Oyster Company (DBOC).”

xxix. CCC 2009a, Letter from California Coastal Commission to Drakes Bay Oyster Company, regarding Compliance with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company). Dated December 7, 2009. Notice of violation related to placement of Manila clams in harbor seal exclusion area.

“In a letter dated September 16, 2009, we indicated that you were out of compliance with Sections 3.2.8 and 3.2.11 of the Consent Order. Section 3.2.8 of the Consent Order requires that cultivation of Manila clams shall only occur in the “cultivation area” defined in Section 3.2.11 of the Consent Order. Section 3.2.11 of the Consent Order requires that all cultivation shall be confined to areas which are currently identified in the Department of Fish and Game (DFG) Mariculture Lease numbers M-438-01 and M-438-02. We further indicated that the Commission staff had confirmed that Manila clams were currently being cultivated outside the designated one-acre shellfish aquaculture lease specified in the DGF Mariculture Lease Number M438-02, in violation of the Consent Order.”

xxx. DBOC 2009a, Letter from Drakes Bay Oyster Company to California Coastal Commission, December 21, 2009, regarding Manila clam lease transfer coordinate mistake.

“Removing the bags was a simple three hour task of lifting the bags up off the sandbar and hand carrying them to the two barges that were attached to the boat.”

xxxi. DBOC 2009b, Letter from Drakes Bay Oyster Company to California Coastal Commission, October 5, 2009, regarding Coastal Development Permit Application No. 2-06-003.

“Drakes Bay Oyster Company (DBOC) has reduced the scope of development proposed for the site. The new project description is broken into four categories:...”

xxxii. DBOC 2010f, Letter from Drakes Bay Oyster Company to California Coastal Commission, March 16, 2010, regarding response to CCC letter dated March 9, 2010, with answers and clarifications.

“We have also revised our project description and it is attached to this letter. We will provide you an update on the revisions to the NPS special use permit when an update is available.”

xxxiii. DBOC 2010m, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, July 22, 2010, regarding DBOC request to modify boundaries of CDFG lease and to cultivate Olympia oysters and purple-hinged rock scallops in CDFG Lease M-438-01.

“We have also requested authorization from CDFG to cultivate Olympia oysters and Purple Hinged Rock Scallop within Lease No. M-438-01. Both species are indigenous to Drakes Estero and can be found today under natural conditions. In fact, Purple Hinged Rock Scallop are already authorized for cultivation within Lease No. M-438-02. No new culture methods will be required to cultivate Olympia oysters or Rock Scallop. Nor will there be any expansion in production, as the Olympia oysters and Rock Scallop will displace Pacific oysters currently under cultivation.”

xxxiv. DBOC 2010n, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement..

“Attachment B: Proposed Project Description Drakes Bay Oyster Company Special Use Permit.”

xxxv. DBOC 2011c, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, March 4, 2011, regarding request to cultivate native species and supporting information.

“DBOC has hoped to add native species to its State water bottom lease for several years. There are a number of reasons that have contributed to our desire to add these natives..... Since the Pacific oyster was introduced to the West Coast, the Olympia oyster, a traditional food for our community, is all but lost. The fabulous Purple Hinged Rock Scallop, another local, traditional food, is not cultured anywhere in California. For these reasons, we have been studying and researching these two species for five years with the hope of replacing some of our non-native Pacific oyster culture with these native species.”

xxxvi. DBOC 2011e, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, March 15, 2011, regarding lease boundary adjustment.

“DBOC has systematically sought to resolve many JOC administrative problems since January of 2005. One by one, DBOC has corrected concerns of the Point Reyes National Seashore (PRNS), the California Coastal Commission (CCC), the California Department of Public Health (CDPH), the US Public Health Service (PHS), the Food and Drug Administration (FDA), the County of Marin and the CDFG. This lease line error represents only one more administrative problem needing correction. Over the past two years, DBOC has worked with CDFG to address this particular issue. CDFG required DBOC to ...determine exactly where the lease boundary line was drawn and to propose a solution so that the 5 racks on Bed 6 would be properly located within the lease, as originally intended....solution is to move the lease line to the location that it was originally intended to be so that the 5 racks in Bed 6 are also within the lease.”

xxxvii. DBOC 2011g, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore, March 5, 2011, regarding alternate building design (Eco Design Alternative).

“DBOC would like to respectfully request that another building design be considered as an alternative in the EIS. In 2009, DBOC worked together with Eco Design Collaborative (EDC) on a more environmentally friendly building concept (attachment a) that would serve the same overall

purposes. This EDC design incorporates renewable energy use as well as other green building principles. The design limits the construction to one building, removes the need for the stringing shed in the intertidal area, allows a larger setback from the water's edge for the new hatchery, raises it above potential sea level rise and includes only one pier to access the Estero. The EDC design would also improve the visitor experience and interpretive opportunities by allowing the public to view every step of the shellfish process, from seed production to shucking and packing. EDC included a comparative review of existing conditions, the building proposal chosen in the 1998 NEPA process and the 2009 EDC concept (attachment b). The concept drawings do not show any worker housing except a manager's residence. Worker housing may be incorporated into the design in the future."

xxxviii. CCC 2010a, Letter from Coastal Program Analyst, California Coastal Commission to Acting Superintendent, Point Reyes National Seashore on March 30, regarding Coastal Development Permit Application for Drakes Bay Oyster Company.

"The Coastal Commission's regulations require an applicant to provide evidence of land owner approval to complete a coastal development permit application. In this case, since the land owner is the NPS, we would appreciate your review of DBOC's current proposed project to identify those proposed project elements authorized by DBOC's Special Use Permit or any other approval granted to DBOC by the NPS."

xxxix. DBOC 2011a, Letter from Drakes Bay Oyster Company to permitting agencies on April 4, regarding Drakes Bay Oyster Farm Emergency Repair Project Description. Document described plans for emergency repairs and included diagrams.

xl. DBOC 2011b, Letter from Drakes Bay Oyster Company to permitting agencies on March 25, regarding Emergency Repair Permit Applications for Damages Caused by the March 19 & 20, 2011 Wind Storm. Document described plans for emergency repairs and included diagrams.

xli. CCC 2012a, Letter from California Coastal Commission to Drakes Bay Oyster Company on February 1, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

"As you know, the Coastal Act contains many enforcement remedies for Coastal Act violations, and we have attempted to avoid the need to invoke them, by offering to discuss with you an amicable resolution of these violations of the Consent Order. Therefore, please submit by February 29, 2012 a written response to the concerns raised in my letter of September 29, 2011: 1) discharge of marine debris into Drakes Estero and onto nearby coastal beaches, especially in the form of abandoned, discarded, or fugitive plastic aquaculture materials, and 2) motorized vessel transit in the lateral sandbar channel near the mouth of the Estero during the seasonal restriction period established for harbor seal pupping sites in this area. In this letter, please describe in detail specifically how and when you intend to resolve these alleged violations of the Coastal Act and the Order, including a proposal for resolution of the outstanding stipulated penalties for failure to comply with the Order."

xlii. DBOC 2012a, Letter from Drakes Bay Oyster Company (with attachments) to the California Coastal Commission on February 17, regarding CDP Application Number 2-06-003.

xliii. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"In a meeting at the California Coastal Commission office in San Francisco on March 5, 2012, CCC and DBOC reached an agreement that DBOC would limit its current CDP application to the existing activities. In keeping with that process, DBOC has removed all new development from its

application to the CCC. DBOC will apply to CCC for a CDP amendment in the future, as necessary, prior to future development.”

xliv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent Cicely Muldoon, Point Reyes National Seashore on June 5, regarding responses to April 2012 questions.

“Drakes Bay Oyster Company (DBOC) received the Point Reyes National Seashore (PRNS) letter dated April 6, 2012 requesting additional information from DBOC for use in the dEIS process. This response letter, together with its attachments, will provide the requested information.”

xliv. CCC 2012b, Letter from California Coastal Commission to Kevin Lunny, Drakes Bay Oyster Company on July 30, 2012, regarding compliance within the Coastal Act and Consent Cease and Desist Order CCC-07-CD-11.

“Commission staff received a copy of the letter DBOC sent to Superintendent Muldoon on May 7, 2012, regarding DBOC’s CDP application. The Commission permit staff are evaluating the information provided in the letter and will be responding to you in a separate letter, in order to clarify our understanding of the March 5th meeting we held with you (which differs from the characterization of this meeting that was provided in your letter) and to request additional information regarding the proposed amendments and modifications to DBOC’s CDP application that you also describe in your letter. However, because your May 7, 2012 letter to Superintendent Muldoon also discusses development activities that DBOC has pursued without benefit of a CDP, we would also like to provide a brief response to this aspect of your letter here.

Despite any misunderstandings DBOC might have had about the requirements for CDPs due to previous experience with ranch repairs, as you have been informed in our many letters to you, including the Notices of Violation and the Notices of Intent to proceed to an order heading, any development in the coastal zone portion of Point Reyes National Seashore requires a CDP from the Commission unless otherwise exempt from permit requirements. While there are some types of exempt development, DBOC should not assume without verification from Commission staff that a development activity falls into this category.”

xlvi. CCC 2012e, Letter from Executive Director, California Coastal Commission to Drakes Bay Oyster Company on October 24, regarding Notice of Intent to Commence Cease and Desist and Restoration Order Proceedings.

“The purpose of this communication is to notify you of my intent, as the Executive Director of the Commission, to commence proceedings for issuance of cease and desist and restoration orders to address unpermitted development as well as development inconsistent with the Johnson Order and the 2007 Order (collectively ‘the Orders’) through a formal enforcement action, either through a consent or regular order proceeding, and to continue the process of discussions that my staff and you have already begun.”

xlvii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC requests that all financial information remain confidential.”

xlviii. DOI 2012b, Letter (with attachments) from Scientific Integrity Officer to Group Manager, Integrated Water Resources, Atkins North America, Inc. on April 19, regarding Dr. Christopher Clark’s review of the soundscapes section of the Draft EIS.

“Questions for Dr. Clark

1. Please review the data provided by ENVIRON and provide your opinion as to whether the ENVIRON measurements provide sound and reasonable information regarding the acoustic environment at Drakes Bay including whether the data was collected using appropriate techniques

and whether any additional information would benefit NPS in addressing the ENVIRON data in the Final EIS (e.g., measurement protocols, weather conditions, operation condition of equipment).

2. Based solely on your interpretation of the scientific information related to acoustics, are there different values and/or references for acoustics measurements (other than those in the DEIS) that appear credible and should be addressed in the Final EIS?

3. Does new attention on the sources of the data in Table 3.3, the ENVIRONS data, or any additional or different values or references for measurements identified in response to question 2 alter your review of the DEIS chapter on acoustics? If so, what is your current assessment of the discussion of soundscapes in the DEIS?"

xlix. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Approximately 40% of DBOC income is from onsite retail sales, 40% is sold directly to local market and restaurants – all delivered by DBOC directly, 18% is sold to Tomales Bay shellfish growers, and 2% is sold through a wholesale seafood distributor based in San Francisco."

I DBOC 2011i, Correspondence ID 52043, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company's comments on National Park Service Draft Environmental Impact Statement for Special Use Permit. Attachment: Comments on Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement Point Reyes National Seashore, prepared by ENVIRON International Corporation.

"All 22 workers at DBOC, who would lose their jobs if DBOC operates were cease, are of Hispanic or Latino ethnicity, and most also fall into the category of low-income."

li. CCC 2012a, Letter from California Coastal Commission to Drakes Bay Oyster Company on February 1, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

"As you know, the Coastal Act contains many enforcement remedies for Coastal Act violations, and we have attempted to avoid the need to invoke them, by offering to discuss with you an amicable resolution of these violations of the Consent Order. Therefore, please submit by February 29, 2012 a written response to the concerns raised in my letter of September 29, 2011: 1) discharge of marine debris into Drakes Estero and onto nearby coastal beaches, especially in the form of abandoned, discarded, or fugitive plastic aquaculture materials, and 2) motorized vessel transit in the lateral sandbar channel near the mouth of the Estero during the seasonal restriction period established for harbor seal pupping sites in this area. In this letter, please describe in detail specifically how and when you intend to resolve these alleged violations of the Coastal Act and the Order, including a proposal for resolution of the outstanding stipulated penalties for failure to comply with the Order."

lii. DBOC 2012a, Letter from Drakes Bay Oyster Company (with attachments) to the California Coastal Commission on February 17, regarding CDP Application Number 2-06-003.

liii. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"In a meeting at the California Coastal Commission office in San Francisco on March 5, 2012, CCC and DBOC reached an agreement that DBOC would limit its current CDP application to the existing activities. In keeping with that process, DBOC has removed all new development from its

application to the CCC. DBOC will apply to CCC for a CDP amendment in the future, as necessary, prior to future development.”

liv. CCC 2012e, Letter from Executive Director, California Coastal Commission to Drakes Bay Oyster Company on October 24, regarding Notice of Intent to Commence Cease and Desist and Restoration Order Proceedings.

“The purpose of this communication is to notify you of my intent, as the Executive Director of the Commission, to commence proceedings for issuance of cease and desist and restoration orders to address unpermitted development as well as development inconsistent with the Johnson Order and the 2007 Order (collectively 'the Orders') through a formal enforcement action, either through a consent or regular order proceeding, and to continue the process of discussions that my staff and you have already begun.”

Iv. NPS 2003c, Letter from Point Reyes National Seashore Superintendent to Johnson Oyster Company on September 17.

“Finally, we must ensure you realize that you do not have authority or permission to construct any new facilities on the reservation lands or other lands authorized under permits. Regarding any new facilities that were authorized by the completion of the Johnson Oyster Replacement and Rehabilitation Environmental Assessment in 1998, the NPS revokes any authority for construction and replacement activities.”

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An aerial photograph of a river delta system, likely the Columbia River, showing a complex network of channels and sandbars. The surrounding land is green and hilly. A large, bold black number '2' is overlaid in the upper right quadrant of the image.

2

ALTERNATIVES

2

ALTERNATIVES

INTRODUCTION

Consistent with NEPA and the stated purpose and need, this EIS explores a reasonable range of alternatives, including a no-action alternative (see, 40 CFR 1502.14). This chapter presents one no-action alternative, under which DBOC's operations would end after the existing authorizations for DBOC expires on November 30, 2012, and three action alternatives, under which the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC to operate in Drakes Estero for a period of 10 years through November 30, 2022. The action alternatives analyzed in this document were selected based on their ability to address the purpose of and need for action and project objectives and because they allow analysis of a full and reasonable range of alternatives. As set forth in chapter 1, the purpose of and need for action in this EIS is based on the Secretary's discretionary authority under section 124 of PL 111-88. This EIS also analyzes the impacts that these alternatives could have on the human environment. "Chapter 4: Environmental Consequences" of this EIS presents the results of these analyses.

The alternatives include both broad-scale and site-specific elements. In some instances, sufficient detail is available to analyze site-specific impacts. In other cases, information is not available, or plans are insufficiently developed, to allow detailed analysis. In the latter case, a conceptual level of analysis has been conducted. Depending on the alternative selected, the level of detail available during the preparation of this EIS and the impacts identified, some specific actions may be implemented without additional evaluation under NEPA, subsequent to the completion of this EIS process. In other cases, additional design of proposed concepts and evaluation of a reasonable range of alternatives would be required.

ALTERNATIVES DEVELOPMENT

The alternatives presented in this EIS were developed taking into consideration the results of internal discussions, review of public comments, and consultation with local, state, and other federal agencies. Development of the action alternatives also was informed by the scope and scale of the existing DBOC operations and facilities, as authorized by the existing RUO and 2008 SUP. During the process of developing this EIS, DBOC comments, responses, and submittals to other agencies were reviewed. In addition, DBOC conducted a site tour with the NPS and consultants. The alternatives development process also included a review of previous documents regarding operations and development within the

project area, reference materials, and the recommendations of the NAS report *Shellfish Mariculture in Drakes Estero* (2009). Additional reviews conducted specifically regarding this document have also been taken into account. Additional detail on use of these publications is included in the “Independent Reviews of the Science Used in this EIS” section of chapter 1.

The alternatives are described in detail in the following sections. A side-by-side comparison of the alternatives is presented in table 2-5 (provided at the end of this chapter). Seven alternative elements that were either technically or economically infeasible or did not meet the purpose of and need for the project were considered and dismissed from further analysis and are discussed later in this chapter.

The NPS evaluated four alternatives in this EIS:

- **Alternative A: No New Special Use Permit—Conversion to Wilderness (No-action)**
Alternative A considers the expiration of the existing RUO and SUP and subsequent conversion to wilderness, consistent with PL 94-567. The existing SUP and RUO expire on November 30, 2012. Under Alternative A, the Secretary would not exercise the discretion granted to him under section 124 to issue a new 10-year SUP. Upon cessation of the nonconforming uses in Drakes Estero, the NPS would convert the area to wilderness. Specifically, under alternative A:
 - At expiration of the SUP, DBOC would be required to remove certain buildings and structures, and all of its personal property and undertake steps to restore the area to good order and condition.
 - All closeout procedures, including removal of structures, personal property, items related to shellfish cultivation and processing, including all racks and bags distributed within Drakes Estero, would be completed consistent with the terms of the existing RUO and SUP.

- **Alternative B: Issue New Special Use Permit—Existing Onshore Facilities and Infrastructure and Offshore Operations Would Be Allowed for a Period of 10 Years**
Alternative B considers a level of use consistent with conditions that were present in fall 2010 when the NPS initiated evaluation under the EIS. The existing SUP and RUO expire on November 30, 2012. The Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative B:
 - Onshore facilities and infrastructure, including previously unpermitted infrastructure, would remain until November 30, 2022. This would be generally consistent with what is currently present on the site.
 - The total acreage of the SUP area, both onshore and offshore, would be approximately 1,083 acres.
 - With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC’s requests, all existing shellfish growing areas would be included in the SUP area and would remain.
 - Mariculture activities, including boat operations, would only take place within the established SUP area.
 - Shellfish production would not exceed 600,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This level of production is consistent with the 2010 DBOC harvest.

- Pacific oysters and Manila clams could be cultivated on documented shellfish growing areas within the main permit area, Area 1 (currently known as Lease M-438-01) using rack culture, floating culture or bottom bag culture methods. Purple-hinged rock scallops could only be grown in the existing 1-acre plot, Permit Area 2 (currently known as Lease M-438-02) using floating racks, floating trays, and lantern nets or similar techniques.
 - DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.
 - NPS would evaluate future requests regarding operational and infrastructure changes from DBOC for consistency with the intent of this alternative, which is to maintain existing conditions and levels of production.
 - By November 30, 2022, DBOC would be required to remove certain buildings and structures and all of its personal property and to undertake steps to restore the area to good order and condition.
- **Alternative C: Issue New Special Use Permit—Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would Be Allowed for a Period of 10 Years**
- Alternative C considers a level of use that was occurring at the time the current SUP was signed in April 2008. The existing SUP and RUO expire on November 30, 2012. Under Alternative C, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative C:
- In contrast to alternative B, onshore infrastructure would be slightly reduced by removing unpermitted and nonessential facilities. Infrastructure would remain until November 30, 2022.
 - The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 901 acres. Those acres not included in the permit area under this alternative are not currently available for production due to state water quality harvest prohibitions.
 - Mariculture activities, including boat operations, would only take place within the established SUP area.
 - With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
 - Shellfish production would not exceed 500,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This represents an approximately 10 percent increase above the average annual DBOC production for the period 2007 to 2009, which was approximately 450,000 pounds per year.
 - Pacific oysters could be grown on documented shellfish growing areas within the main offshore permit area, Area 1 (currently known as Lease M-438-01) using rack culture, floating culture, or bottom bag culture methods. Purple-hinged rock scallops could only be cultivated in the existing 1-acre plot, Area 2 (currently known as Lease M-438-02) using floating racks, floating trays, and lantern nets or similar techniques.
 - DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.

- NPS would evaluate future requests for operational and infrastructure changes from DBOC taking into consideration consistency of the proposed changes with 2008 conditions and levels of production.
- By November 30, 2022, DBOC would be required to remove certain buildings and structures, and all of its personal property, and undertake steps to restore the area to good order and condition.

- **Alternative D: Issue New Special Use Permit—Expanded Onshore Development and Offshore Operations Would Be Allowed for a Period of 10 Years**

Alternative D considers expansion of operations and development of new infrastructure as requested by DBOC as part of this EIS process, as well as items requested of other agencies. The existing SUP and RUO expire on November 30, 2012. Under alternative D, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Specifically, under alternative D:

 - Two development proposals submitted by DBOC are evaluated at the conceptual level in this EIS. Additional planning, design, environmental compliance (including NEPA), and approval would be required prior to proceeding with construction of proposed new facilities. Infrastructure would remain until November 30, 2022.
 - The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 1,087 acres, which incorporates the boundary adjustment requested by DBOC.
 - With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
 - Mariculture activities, including boat operations, would only take place within the established SUP area.
 - Shellfish production would not exceed 850,000 pounds annually (using the rolling 3-year average described later in this chapter, inclusive of all harvested species). This production level is based on DBOC's projections of maximum production levels (submitted to CCC).
 - Pacific oysters, Manila clams, Olympia oysters, and purple-hinged rock scallops could be cultivated in documented shellfish growing areas within the offshore permit area using rack culture, floating culture, or bottom bag culture methods. The 1-acre plot, currently known as Lease M-438-02, would not be maintained as a distinct shellfish growing area.
 - DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas within the permit boundaries, as mandated by section 124.
 - NPS would evaluate future requests from DBOC for consistency with the intent of this alternative, which is to allow for expanded operations within the scope of the conceptual proposal; approval/compliance for future development would be through a tiered planning process.
 - By November 30, 2022, DBOC would be responsible for the removal of all infrastructure developed under this alternative, as well as all personal property. DBOC would be required to restore the area to good order and condition.

EXISTING CONDITIONS

Development of the action alternatives is based on the scope and scale of the existing DBOC operations and facilities, as authorized by the existing RUO and 2008 SUP. In order to provide context for the alternatives considered in this EIS, this section describes DBOC operations and facilities both offshore within Drakes Estero and onshore. The term offshore is used to refer to operations and facilities in Drakes Estero, including intertidal areas such as the shoreline and mudflats. Discussion of onshore operations and facilities generally refers to those areas above mean high tide but also may include items that stretch into the intertidal area, such as the main dock.

Both onshore and offshore areas are owned by NPS as discussed in chapter 1. DBOC operates within the Seashore under authorizations issued by the NPS. This approval takes the form of the current SUP and RUO. The existing SUP was signed on April 22, 2008 and expires concurrently with the 40-year RUO on November 30, 2012. Copies of these documents can be found in appendix A. DBOC also has mariculture leases from CDFG. These are Lease M-438-01 and Lease M-438-02. The 2008 SUP references these leases for the shellfish species that NPS authorized for cultivation within Drakes Estero.

SPECIAL USE PERMIT AREA AND MARICULTURE SPECIES

The 2008 SUP authorized DBOC to generally operate within the same offshore boundaries as contained in Lease M-438-01 (1,049 acres¹) and Lease M-438-02 (1 acre). Lease M-438-01 is split into two parcels: Parcel 1 contains 343 acres on the east side of Drakes Estero and Parcel 2 contains 706 acres on the west side of Drakes Estero. Within these offshore lease boundaries, DBOC maintains approximately 142 acres of shellfish growing areas. Shellfish growing areas are otherwise known as “culture beds” or simply “beds” and can include any of the shellfish cultivation methods described later in this section (i.e., hanging culture or bottom culture). The specific numbered culture beds that make up the 142 acres of growing area are derived from maps provided by DBOC (DBOC 2010cⁱ) and are shown on figure 2-1.

The lease boundaries were drawn prior to creation of the harbor seal protection areas designated in the 2008 SUP. Another concern with the original lease boundaries is that they were drawn without the aid of current technology. It should be noted that the lease boundaries were also identified in the SUP as the offshore permit area. DBOC asserts that the original mapping mistakenly excluded five of the racks in Bed 6 that were in existence at the time (DBOC 2011eⁱⁱ). Although most correspondence has cited five racks outside of the existing lease areas, the GPS (global positioning system) data provided by DBOC (DBOC 2010eⁱⁱⁱ) and being used to support the development of this EIS indicates six racks outside the GIS lease boundaries as supplied to NPS by CDFG in 2011.

In May of 2010, DBOC submitted a request to the CFGC for a boundary adjustment to Lease M-438-01 to include the racks currently outside the lease boundaries and to exclude some of the lease area within the harbor seal protection areas (DBOC 2010h^{iv}). The area where Bed 6 extends outside the existing boundaries of Lease M-438-01 can be seen on figure 2-1.

¹ Since the consolidation of several allotments into Lease M-438-01 in 1979, the lease language has specified that the lease area is made up of two parcels totaling approximately 1,059 acres; however, the GIS data provided by CDFG in 2011 for this lease area measures 1,049 acres. For the purposes of this EIS, all area calculations are based on GIS data. Therefore, the latter measurement is used to represent existing conditions throughout this EIS.

Figure 2-1 also shows the areas of Drakes Estero in which boat traffic is known to take place (more detail on this aspect of operations is provided later) and the harbor seal protection areas. The onshore areas in which DBOC is authorized to operate are described in the DBOC operations and facilities section below.

Mariculture Species

This section describes the species currently grown and/or authorized by current permits in Drakes Estero or proposed by DBOC for inclusion in a new SUP. DBOC currently grows, processes, and sells two species of shellfish: Pacific oyster and Manila clam. European flat oysters and Kumamoto oysters are currently authorized, but DBOC does not currently grow, process, or sell them. Olympia oysters and purple-hinged rock scallops are not currently grown but are proposed by DBOC for future cultivation.

Pacific Oysters. Pacific oysters, native to Japan, are cultivated only within shellfish growing areas depicted on the map provided by DBOC (DBOC 2008b^v) (see figure 2-1 for lease boundaries and specific culture beds). Cultivation of Pacific oysters within Drakes Estero has been authorized in some form since the 1930s, and it was one of the two oyster species (along with European flat oysters) identified by CDFG in 1979, when CDFG began to specify which individual species were authorized in each lease. According to tax records for 2007 through 2009, the average annual production of Pacific oysters by DBOC within Drakes Estero has been 454,036 pounds per year (approximately 5.34 million oysters harvested per year). Since 2009, Pacific oyster production at DBOC steadily increased to 585,277 pounds in 2010 (6.89 million oysters harvested) and 618,375 pounds in 2011 (7.28 million oysters harvested). These quantities reflect a conversion from the number of oysters harvested (as reported in official DBOC Proof of Use reports and privilege use tax records submitted to CDFG) to pounds of shucked oyster meat (CDFG 2006, 2009, 2010a). Within Drakes Estero, CDFG has used the standard of 100 Pacific oysters per gallon as the term of measurement. This conversion calculates the number of Pacific oysters divided by 100 (this represents gallons harvested). In other areas of the state, CDFG uses 140 Pacific oysters per gallon as the standard conversion (CDFG [Ramey], pers. comm., 2011d). In order to convert gallons to pounds, gallons are multiplied by a factor of 8.5 pounds per gallon (CDFG [Ramey], pers. comm., 2011d). Additional details on production levels in Drakes Estero between 1979 and 2011 are provided in table 2-1 at the end of this section.

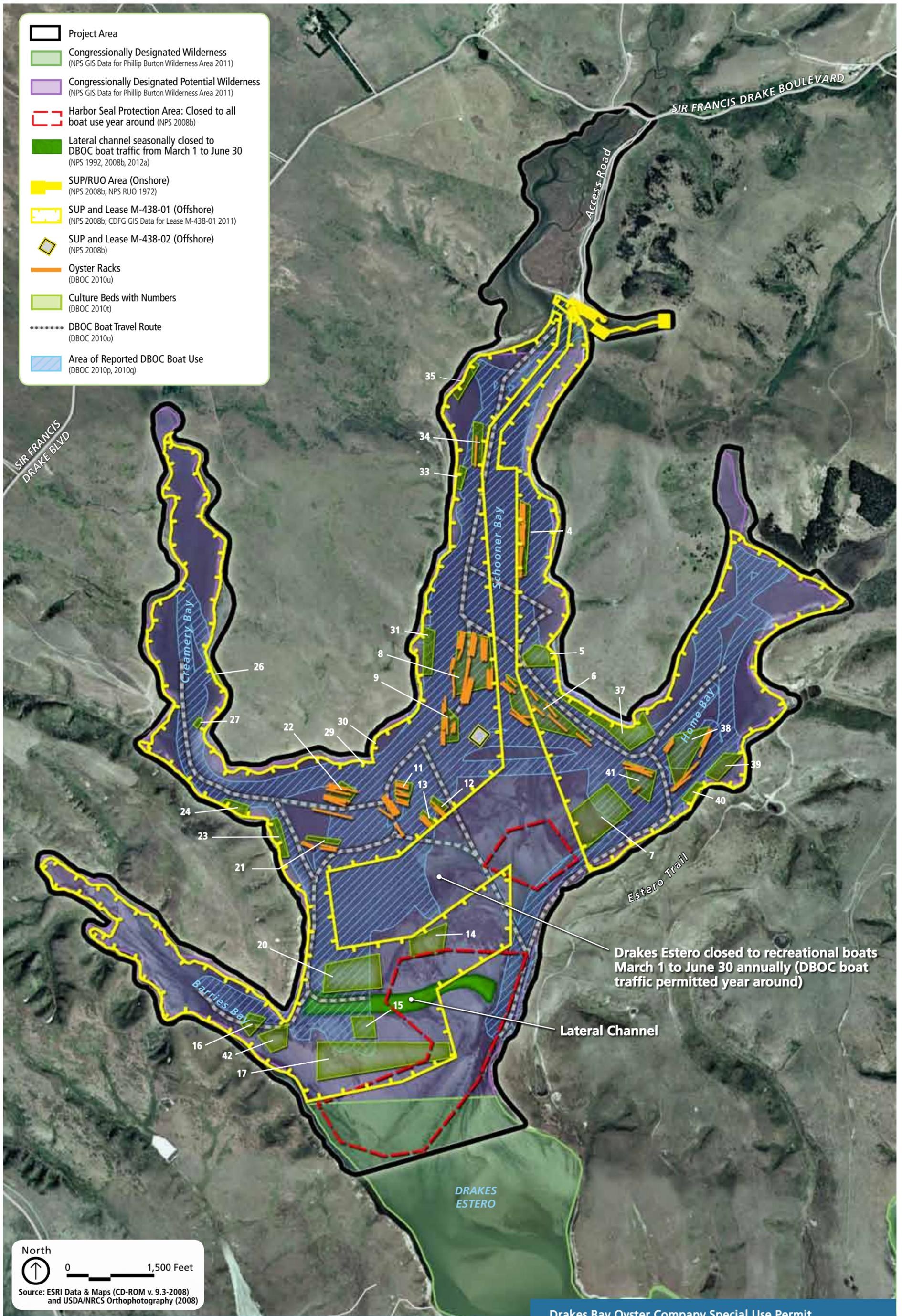


Pacific oyster (*Crassostrea gigas*).
(Photo courtesy of VHB.)

European Flat Oysters. European flat oysters, native to Europe, have been included in Lease M-438-01 since 1979 and are permitted in the 2008 SUP. DBOC does not currently cultivate this species. According to records submitted by DBOC to CDFG, DBOC has never planted or harvested European flat oysters. DBOC reported in 2008 that small numbers of this species (remnants of prior plantings by JOC) still existed within the area of Lease M-438-01 as of January 2008 (DBOC 2008b^{vi}); however, in correspondence to NPS in June 2012, DBOC advised that no European oysters were produced in Drakes Estero by JOC (DBOC 2012b^{vii}). According to records provided to NPS by CDFG, the only record of European flat oysters being harvested at the site is from April 1968 (CDFG 2011c).



European flat oyster (*Ostrea edulis*).
(Photo courtesy of http://genimpact.imr.no/species/european_flat_oyster.)



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 2-1
Existing Conditions (Offshore Operations)



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

Kumamoto Oysters. Kumamoto oysters, native to Japan, have not been permitted for culture in Drakes Estero since 1979. DBOC does not currently cultivate this species. According to records submitted by DBOC to CDFG, DBOC has never sold nor planted Kumamoto oysters. Small numbers of this species still existed within Lease M-438-01 as of January 2008. DBOC has advised that these are remnants of prior plantings by JOC and were removed by DBOC (DBOC 2008b^{viii}). DBOC does not plan to plant Kumamoto oysters in the future, due to their slow growth and has communicated to CCC that it has removed the remnants from Drakes Estero (DBOC 2008b^{ix}, CDFG 2008b^x).



Kumamoto oysters (*Crassostrea sikamea*). (Photo courtesy of <http://www.chefs-resources.com> is licensed.)

Olympia Oysters. Olympia oysters (*Ostreola conchaphila*), native to the California coast, have not been permitted for culture in Drakes Estero since 1979. These oysters require hard substrate on which to grow (Couch and Hassler 1989; Trimble, Ruesink, and Dumbauld 2009) and therefore are unlikely to occur naturally in the soft-bottom estuary that is Drakes Estero. The last records of Olympia oysters being harvested at this site date from 1957-1959 and 1963 (CDFG 2011c).



Olympia oysters (*Ostreola conchaphila*). (Photo courtesy of <http://www.chefs-resources.com> is licensed.)

Purple-hinged Rock Scallops. Lease M-438-02 was originally established by CDFG in 1979 for JOC to culture purple-hinged rock scallops, which are native to the California rocky coast. At the time this lease was issued, CDFG noted that purple-hinged rock scallops “do not occur naturally within the biota of the lease area” (CDFG 1979b). According to tax records, purple-hinged rock scallops have never been sold by DBOC. The last record of scallops being harvested at this site was from May 1994 (CDFG 2011c).



Purple-hinged rock scallops (*Crassadoma gigantea*). (Photo courtesy of L. Schroeder; <http://www.bily.com/pnwsc/web-content/Photos/Bivalves/>.)

Manila Clams. Manila clams, native to the Philippines, were added to Lease M-438-02 in 1993. The CDFG recommendation for use of Area 2 noted that it was a small one acre lease previously used by JOC in the experimental culture of species other than oysters (CFGC 1993^{xi}). The 2004 renewal of the lease for M-438-02 maintained the requirement that “all shellfish cultivation on the lease shall be confined to racks and in trays within the area approved by the Commission” (CDFG 2004e). In December of 2009, CFGC amended the lease to allow cultivation of Manila clams within Lease M-438-01 per a request from DBOC. DBOC did not submit a request for this expansion of species cultivation to NPS, as required by section 4(b)(vi) of the 2008 SUP (NPS 2008b). NPS advised DBOC that additional information was required before NPS could determine whether to approve this modification (NPS 2009e^{xii}). DBOC declined to offer any additional information in its response to the NPS (DBOC 2009c^{xiii}). Manila clam cultivation in the area of Lease M-438-01 has not been authorized by NPS.



Manila clam (*Venerupis philippinarum*). (Photo courtesy of <http://www.squaxin-nr.org/page/15/>.)

In its 2006 proof of use report to CDFG, DBOC reported planting 1 million Manila clam seeds within Lease M-438-02 using the method “bags on bottom” (CDFG 2006). Bottom bag culture is not an authorized cultivation method for Area 2. In its 2009 and 2010 proof of use reports submitted to CDFG, DBOC reports harvest of Manila clams in Lease M-438-01 (primarily in Bed 7) (CDFG 2009a, 2010a). DBOC reported harvest of Manila clams on its privilege use tax forms beginning in February 2009 for Lease M-438-01 (see table 2-1) (CDFG 2009a). CDFG reports that the conversion factor for Manila clams is 30 clams per pound (CDFG [Ramey], pers. comm., 2011d). The average annual harvest of Manila clams since 2009 has been 420 pounds per year (see table 2-1). A total of 458 pounds (13,740 clams) were harvested in 2009, 684 pounds (20,520 clams) were harvested in 2010, and 118 pounds (3,540 clams) in 2011.

Additional background on Manila clam culture within Drakes Estero can be found in the “Shellfish Mariculture in Drakes Estero” section of chapter 1.

Production Limit. For the purposes of this EIS, the action alternatives include various levels of annual production of shellfish including 500,000 pounds, 600,000 pounds, and 850,000 pounds. Section 4(b)(i) of the 2008 SUP states that “production of all shellfish species shall be capped at the ‘current production level’ as determined under the California Coastal Commission Consent Order No. CCC-07-CD-04.” Section 3.2.10 of CCC Consent Order No. CCC-07-CD-04, states that production of all shellfish species shall be capped at the “current production level.” To establish this “current production level,” CCC required that DBOC provide documentation, “including the amount harvested in the last year and any projected increases in yield for the coming year” (CCC 2007b). In its 2008 letter to the CCC on the subject of production limit, DBOC projected a maximum total production of shellfish at 850,000 pounds annually and suggested that the limit be based on that level (DBOC 2008b^{xiv}). In its September 10, 2008, response, the CCC stated, “Commission staff finds that the harvest of 850,000 lbs of shellfish by DBOC would represent a substantial increase over current production levels. Commission staff does not find sufficient evidence within your January 31, 2008 letter to support an assumption that current production would be 850,000 lbs of shellfish” (CCC 2008). To date, CCC has not established a production limit for DBOC. Additional detail on the production limits proposed under each action alternative is discussed later in this chapter.

TABLE 2-1. SHELLFISH SPECIES PRODUCTION BY YEAR (1979–2011)

Year	Species Production*				
	Pacific Oyster		Manila Clam		Purple-hinged Rock Scallop
	pounds [†]	number of individuals [‡]	pounds [§]	number of individuals	pounds [#]
1979	329,953	3,881,800	0	0	0
1980	223,329	2,627,400	0	0	1,730
1981	353,209	4,155,400	0	0	72
1982	410,253	4,826,500	0	0	647
1983	435,022	5,117,900	0	0	664
1984	591,118	6,954,335	0	0	308
1985	590,130	6,942,710	0	0	0
1986	467,544	5,500,521	0	0	0
1987	643,195	7,567,000	0	0	0
1988	639,175	7,519,700	0	0	0
1989	543,303	6,391,800	0	0	0
1990	562,148	6,613,500	0	0	0
1991	570,010	6,706,000	0	0	0
1992	670,591	7,889,300	0	0	0
1993	661,683	7,784,500	0	0	850
1994	684,293	8,050,500	0	0	550
1995	445,706	5,243,600	0	0	0
1996	587,172	6,907,900	0	0	0
1997	476,867	5,610,200	0	0	0
1998	292,188	3,437,500	0	0	0
1999	62,875	739,700	0	0	0
2000	34,094	401,110	0	0	0
2001	131,352	1,545,320	0	0	0
2002	156,126	1,836,800	0	0	0
2003	232,186	2,731,600	0	0	0
2004**	96,754	1,138,282	0	0	0
2005**	138,958	1,634,800	0	0	0
2006	352,960	4,152,470	0	0	0
2007	466,533	5,488,620	0	0	0
2008	436,848	5,139,390	0	0	0
2009	458,726	5,396,777	458	13,740	0
2010	585,277	6,885,612	684	20,520	0
2011	618,375	7,275,000	118	3,540	0

Source: Privilege use tax records submitted to CDFG by JOC (prior to 2004) and DBOC (after 2005) (CDFG 2010b, 2011c).

Note: Although some tax records may not specify species harvested and some reports may contain errors, this document relies upon production data provided by CDFG as the source for DBOC production (CDFG 2010b, 2011c).

* Tax records indicate that these were the only species produced during the time period shown (no European flat oysters or Kumamoto oysters were reported during this time) (CDFG 2010b, 2011c).

[†] Pacific oyster weight calculated from total harvest and reported in pounds on tax reports submitted to CDFG by JOC (prior to 2004) and DBOC (after 2005) (CDFG 2010b, 2011c).

[‡] Number of individuals is calculated based on tax reports. In Drakes Estero, CDFG based weight using conversion of 100 oysters per gallon (per Fish and Game Code Section 15406.7) and 8.5 pounds per gallon (CDFG 2011c).

[§] Manila clam weight is calculated from total harvest and is reported in pounds on tax reports submitted to CDFG by JOC (prior to 2004) and DBOC (after 2005) (CDFG 2010b, 2011c).

^{||} Number of individuals is calculated based on tax reports CDFG measures weight using conversion of 30 clams per pound (CDFG 2011c).

[#] No conversion rate is available for purple-hinged rock scallops. These measurements are reported in pounds on tax reports submitted to CDFG by JOC (prior to 2004) and DBOC (after 2005) (CDFG 2010b, 2011c).

** Tax records are unavailable for 2004 and 2005. These records are based on estimates by the CDFG Marine Region Aquaculture Coordinator in a March 30, 2007 report (CDFG 2007a). POU reports for 2005 confirm production near this level; according to the 2005 POU report, DBOC estimates 153,000 lbs were produced (assuming 100 oysters per gallon and 8.5 pounds per gallon) (CDFG 2006).

DBOC OPERATIONS AND FACILITIES

The following sections describe existing DBOC operations and facilities. This includes descriptions of activities and structures relevant to DBOC commercial shellfish operations as they currently exist, categorized by offshore and onshore. As mentioned above, the term offshore is used to refer to operations and facilities in Drakes Estero, including intertidal areas such as the shoreline and mudflats. Discussion of onshore operations and facilities generally refers to those areas above mean high tide but also may include items that stretch into the intertidal area, such as the main dock. DBOC is acquiring after-the-fact authorization for some unpermitted buildings/structures as part of its efforts to comply with the SUP and coastal development regulations.

Offshore Operations and Facilities

All of DBOC's offshore commercial shellfish operations take place within the areas designated by CDFG as Lease M-438-01 (1,049 acres) and Lease M-438-02 (1 acre), with the exception of six culture racks (discussed below) that are outside the boundary of the SUP and leases. Lease M-438-01 is split into two parcels: Parcel 1 contains 343 acres on the east side of Drakes Estero and Parcel 2 contains 706 acres on the west side of Drakes Estero. Of the 1,050 acres within the leases and SUP, DBOC cultivates shellfish within approximately 142 acres in Drakes Estero. These 142 acres comprise 42 numbered culture beds (see figure 2-1). This represents the total area in which shellfish may be grown; however, DBOC does not necessarily use all 142 acres at once; some beds may lie fallow. For instance, the proof of use report for 2010 reports planting a total of 26.6 acres (CDFG 2010a). The operations described below are based primarily on communication with DBOC through letters (including but not limited to CDP applications and responses to NPS requests for information) and a February 16, 2011, site visit (DBOC [Lunny], pers. comm., 2011h).

DBOC cultivates shellfish using three primary methods: hanging culture, floating culture, and bottom culture. Oysters are grown using all three methods. Manila clams are grown using bottom bag culture. Culture beds, in which racks, tray, and/or bags are placed, are distributed throughout Lease M-438-01. Table 2-2 summarizes which culture types take place in which beds and figure 2-1 depicts the location of racks and culture beds.

Racks. The wooden racks are made up of bents and stringers. Based on a review of available photos, most of the racks are constructed of pressure-treated dimensional lumber. The DBOC spreadsheet indicates that the racks are supported by a total of 2,139 bents spaced at 12-foot intervals (DBOC 2010e^{xv}). The bents are anchored in the bed of the Estero and provide the primary structural support for the racks. Generally, the bents consist of three 2-inch by 6-inch boards sunk into the substrate and held together by a 2-inch by 4-inch and 2-inch by 6-inch cap board. Stringers are installed over the tops of the bents and are the boards that hold the strings of oysters. Six stringer boards make up the top of the rack for the entire length of the rack. The approximate width of the racks is 12 feet. The stringers are generally 2-inch by 4-inch or 2-inch by 3-inch boards. Individual stringer boards are installed with overlap that is estimated at 25 percent.



Racks used for hanging culture are made up of bents (the vertical boards anchored in the substrate) and stringers (the horizontal boards on which oysters are strung), as seen during low tide (Photo courtesy of NPS.)

DBOC maintains 95 wooden racks for cultivation, which total approximately 5 miles when laid end-to-end (also expressed as 7 acres), within Drakes Estero. Currently, six of these racks fall outside the permit boundaries. According to information provided by DBOC, just over half (53 percent) of the racks are currently in poor condition (DBOC 2010e^{xvi}). The DBOC spreadsheet had a combined column for “need repair, inactive” (DBOC 2010e^{xvii}); however, during a site visit on February 16, 2011, DBOC indicated that racks in poor condition may be used to support floating culture methods described below (DBOC [Lunny], pers. comm., 2011h). DBOC estimates that roughly half of the DBOC production originates on racks and is finished in bags on the bottom; the other half begins in floating bags and is finished in bags on the bottom (DBOC 2012b^{xviii}).

In 2005, NPS advised DBOC that ACZA (ammoniacal copper zinc arsenate)-treated lumber could be used to make repairs to existing racks (NPS 2005^{xix}), and DBOC worked to repair the racks previously maintained by JOC from 2005-2007 (DBOC 2012b^{xx}). DBOC has not repaired any oyster racks since agreeing to Consent Order No. CCC-07-CD-04 in November 2007 and, as agreed upon in the consent order, will not make any repairs to the oyster racks until a CDP has been obtained and the NPS, CDFG, and CCC have approved all repair materials (DBOC 2009d^{xxi}). DBOC estimates that just over half of the racks need repair (DBOC 2010e^{xxii}). In 2008, the NPS issued the SUP for DBOC operations stating “All lumber utilized at the site will be processed in compliance with current laws and regulations regarding wood treatments” (Section 6[i], NPS 2008b). Most recently, in response to a request for emergency dock repairs, USACE has advised DBOC that “any chemically treated wood material must be coated with an impact-resistant, biologically inert substance” (USACE 2011b). Future repair of these structures is described in more detail as part of the action alternatives later in this chapter.

Hanging Culture. Wooden racks in relatively good condition support “off-bottom” culture methods such as Japanese hanging culture and the French tube culture. In Japanese hanging culture, oysters are grown on recycled left valves (shells), and these shells are strung along wires through holes punched in the recycled shell. Clumps of approximately 14 shells are separated by approximately 6 inches of polyvinylchloride (PVC) piping to allow for cluster development. These wires are completely suspended and should not make contact with the bottom of Drakes Estero. From the time oysters are initially placed on the racks, they require approximately 16 to 18 months to reach market size, depending on environmental conditions. DBOC indicated to CCC in March 2010 that it had replaced Japanese hanging culture with French tube culture (DBOC 2010f^{xxiii}) (described below); however, in its November 2010 submittal to NPS, DBOC described Japanese hanging culture as one of the culture methods being used and was identified in Drakes Estero by DBOC staff during a recent site visit (DBOC 2010a^{xxiv}, [Lunny], pers. comm., 2011h).



Japanese hanging culture in Drakes Estero
(Photo courtesy of VHB.)



French tube culture in Drakes Estero
(Photo courtesy of VHB.)

In French tube culture, oysters are grown directly on the tubes. These tubes, known as French tubes, are roughly coated in concrete. As in Japanese hanging culture, the tubes are hung on the racks, and it takes approximately 12 months for oysters to reach market size. Both of these hanging cultures are used for growth of oyster clusters. Due to an existing shortage of rack space, DBOC currently places oysters on intertidal areas for up to nine months for shell hardening prior to processing, but they note that otherwise, the shells generally require only an additional two to three months of beach hardening (DBOC 2010a^{xxv}, 2012b^{xxvi}).

DBOC grows single oysters and clams within bags and trays. Trays and bags can be suspended as a type of hanging culture or can be used for hanging culture using racks or Styrofoam floats, as discussed below. Hanging culture with trays and bags is generally used for the purpose of seed rearing single oysters (the process of growing larval oyster stages to maturity). Otherwise, bags are set on sandbars or shoreline intertidal areas.

Bottom Culture. Setting bags on sandbars or shoreline intertidal areas is a form of bottom culture. Bags are used both for the nursery stage of oyster growth (following initial attachment to substrate and growth in the setting tanks on shore) and for the “grow-out” stage (the stage where young mature oysters reach market size). A common bag type used is a 3-foot by 2-foot rubber mesh bag. Trays are 3 feet by 3 feet. Table 2-2 provides a breakdown of which culture types take place in which beds (bed numbers are provided on figure 2-1), along with the acreage of each bed.

According to DBOC, bags in areas with strong currents are anchored to the Estero bottom using PVC piping (DBOC did not specify the length of the PVC anchors), cinder blocks, or large (100-pound) concrete anchors (see photos below) (DBOC 2010b^{xxvii}, 2012b^{xxviii}). Anchored lines may be left in place for subsequent planting in the same area. Bags in areas with little current are left unanchored (DBOC 2010b^{xxix}).



Bottom bag culture in Drakes Estero, anchored with cinder blocks. Photo taken during low tide conditions when sand bars are exposed. (Photo courtesy of NPS.)



Tray used for culture in Drakes Estero (trays are stacked when installed in Drakes Estero). (Photo courtesy of VHB.)

Floating Culture. In addition to hanging culture, as described above, DBOC also uses a couple types of floating culture. The bottom bags mentioned above can be used for a type of floating culture where bags are anchored along long lines, but by using closed-cell Styrofoam, these bags are allowed to float during higher water levels associated with the tide (DBOC 2010b^{xxx}). In other cases, racks that are in poor condition and cannot support strings are used for floating bags. Floating bags are sometimes hung between racks. In these cases, the racks serve as anchors. Other floating systems near the racks are secured by concrete anchors (DBOC 2012b^{xxxi}) as pictured here.



Floating bag culture in Drakes Estero. (Photo courtesy of NPS.)



Concrete anchor (approximately 100 pounds) used for floating culture. (Photo courtesy of DBOC.)

TABLE 2-2. CULTURE TYPE BY BED NUMBER

Bed Number	Culture Type	Acreage
1	ND	ND
2	ND	ND
3	ND	ND
4	Racks	4.63
5	Bottom bags	3.59
6	Racks	12.43
7	Bottom bags Floating bags	13.54
8	Racks	13.52
9	Racks	3.41
10	ND	ND
11	Racks	1.92
12	Racks	1.06
13	Racks	0.61
14	Bottom bags	5.30
15	Bottom bags Floating bags	2.98
16	Bottom bags	1.88
17	Bottom bags Floating bags	23.46
18	ND	ND
19	ND	ND
20	Bottom bags Floating bags	11.66
21	Racks	2.45
22	Racks	2.86
23	Bottom bags	1.57
24	Bottom bags	0.68
25	ND	ND
26	Bottom bags	1.57
27	Bottom bags Floating bags	0.30
28	ND	ND
29	Bottom bags	ND
30	Bottom bags	ND
31	Bottom bags	2.96
33	Bottom bags	0.98
34	Racks	2.75
35	Bottom bags	1.91
36	ND	ND
37	Bottom bags Floating bags	8.15
38	Racks Floating bags	8.24
39	Bottom bags Floating bags	2.91
40	Bottom bags	1.59
41	Racks Floating bags	4.90
42	Bottom bags	3.22

Source: DBOC 2010d^{xxxii}

ND = no data

Other Culture Methods. JOC historically used stake culture in Drakes Estero; however, this method proved unstable during storm events and resulted in the release of large amounts of mariculture-related debris (discussed below). Due to the issues associated with this method, stake culture was phased out (replaced by bag culture) by the mid 1990s (DBOC 2012d^{xxxiii}). Although JOC used stake culture in the past, DBOC is not known to use this method (DBOC 2008e^{xxxiv}, 2012d^{xxxv}) and has not proposed to use this method; therefore, it is not addressed in this EIS.

DBOC also has experimented with other seed methods. In 2009, structures containing stacked French tubes were placed in Drakes Estero. DBOC states that this method is no longer used (DBOC 2011f^{xxxvi}). According to section 4(b)(ii) of the SUP, DBOC must obtain prior approval from the NPS before any additional aquaculture cultivation infrastructure is constructed. Furthermore, construction of improvements or alterations is subject to NPS approval under section 6 of the SUP.

Shellfish Cultivation Areas. DBOC has divided the areas in which it cultivates shellfish into 42 culture beds, as described above and displayed on figure 2-1. These 42 beds total approximately 142 acres, according to GIS estimates, which are based on versions of bed locations provided by DBOC (DBOC 2010c^{xxxvii}). In a separate file where the racks alone are described, DBOC estimates that there are a total of 7 acres of racks (including the six racks outside Lease M-438-01) installed in Drakes Estero (DBOC 2010e^{xxxviii}). This more conservative estimate of rack acreage is used throughout the EIS instead of adding the acreages of beds above because a sum of all beds supporting rack culture would overstate the acreage which may be directly impacted by racks. For instance, Bed 8 encompasses 13 acres and includes 22 racks. Bed 8 is listed as being used for rack culture alone; however, the boundary of Bed 8 is drawn around the racks, which take up a smaller proportion (approximately 2.16 acres) of the bed.

The list of bed sizes and culture type (as shown in table 2-2) is the only source of information available by which a total acreage of bottom bag culture can be estimated. Based on this information, a maximum of 88 acres of bottom bags may be placed within Drakes Estero at any given time. The actual number varies year to year and is likely to be less than 88 acres because rack culture is also used in some of these beds and some beds are left fallow for a time. Additionally, according to DBOC proof of use reports for 2009 and 2010, DBOC planted 22 acres of bags in each year (CDFG 2009a and 2010a). The length of time a bag stays in Drakes Estero varies depending on the species being cultivated and on environmental conditions; however, it is generally between 18 and 24 months. Bags are turned by hand approximately once a month to remove accumulated sediment that can interfere with oyster growth and may ultimately result in oyster mortality. Turning the bags also reduces the likelihood of oyster shells growing together to form a cluster. Clams are better suited to being covered in sediment; therefore, clam bags are generally not flipped during grow-out (DBOC [Lunny], pers. comm., 2011h).

Mariculture-related Debris. Elements of offshore structures are subject to deterioration and damage by weather events. Deterioration and weather-related damage may result in dispersal of items such as Styrofoam floats, treated lumber displaced from racks, and PVC piping and separators throughout Drakes Estero and along the shoreline. NPS has received a number of comments from visitors claiming to have observed large amounts of mariculture-related debris in Drakes Estero. For instance, during public scoping one commenter submitted photographs to support the observation of the debris associated with mariculture activities in Drakes Estero. The CCC has also been alerted to the issue of marine debris. In letters to DBOC, the CCC expressed concern that DBOC's operation is "apparently resulting in the

release of plastic marine debris” into the environment and that such releases may constitute violations of the Coastal Act and the Consent Order (CCC 2011^{xxxix}, 2012a^{xl}, 2012b^{xli}).

DBOC asserts that it makes a serious effort to maintain structures and retrieve any debris from its operation as well as debris that may be a result of shellfish operations under the previous owners and is in the process of revising its Debris Removal Plan, as required by Section 3.2.3 of Consent Order No. CCC-07-CD-04 (DBOC 2012d^{xlii}). DBOC states that it employs the following practices to reduce the chances of losing culture gear into the environment:

- DBOC removes the oysters from the wires without cutting the wire. No wires are cut when harvesting strings from the racks until above the stringing shed, which is meant to serve as a proxy for the high tide mark. Using this technique, the black plastic spacers are not subject to loss into the environment.
- Beginning in 2006, DBOC began to replace the Japanese Hanging Cultch wire string culture method with “French tubes.” These French tubes reduce consumables (i.e., the wire strings which can only be used for one growing season), and do not require the black spacers. Over the past five years, approximately 100,000 strings have been replaced with the French tube method, and this technique now represents the majority of the rack culture. DBOC does, however, continue to cultivate a portion of its oysters with the traditional wire string and spacer method.
- DBOC checks the oyster racks regularly to remove any loose materials so they are not lost into the environment.
- DBOC anchors all oyster bags in areas where there is potential for tidal energy to displace bags.
- DBOC anchors all floating culture in a least two places and all floating bags are attached to at least two anchored lines. (DBOC 2011i^{xliii})

CCC notes that the 2008 Debris Removal Plan “has proven to be insufficient” (CCC 2012b). DBOC submitted proposed revisions to the Debris Removal Plan to CCC on February 27, 2012. As of the date of publication of this document, the CCC’s inquiry into the presence of aquaculture-related marine debris in the Estero and on Point Reyes beaches is ongoing, as is the CCC’s inquiry into the adequacy of DBOC’s efforts to minimize marine debris.

Boat Operations. The offshore racks and bags are accessed via motorboat. During a February 16, 2011 site visit, DBOC staff advised NPS that DBOC currently operates two motorboats within Drakes Estero: one is 16 feet long with a 20-horsepower 4-stroke engine, while the other is 20 feet long with a 40-horsepower 4-stroke engine. Combined, these boats operate approximately 8 hours per day, 6 days per week, making a total of 12 round trips per day (DBOC [Lunny], pers. comm., 2011h). In its June 5, 2012 response to NPS’s request for additional information, DBOC revised its description of boat use. The most noteworthy difference is that DBOC now uses three boats. DBOC did not provide a size or engine horsepower for the third boat. Otherwise, DBOC notes that the description above represents typical working conditions; however, DBOC also noted that, albeit unusual, all three boats may be in operation all day and that some weeks may require that boats be used all 7 days. DBOC also noted that on some days, no boats are in operation. DBOC must operate around variable demands, including tides, weather, day length, planting season, and high demand occasions (DBOC 2012b^{xliv}). This section is meant only to describe existing boat operations and is not meant to serve as a limitation. Under the action alternatives later in this chapter, it is assumed that boat operations will continue at levels similar to these.

The photograph below shows boat tracks through algae in Drakes Estero (as photographed in 2007), which demonstrates how boats access racks off of established boat routes. Figure 2-2 provides the known area of boat use and the boat travel route provided by DBOC (see discussion below). DBOC boats are not used outside Drakes Estero (Environ 2011).



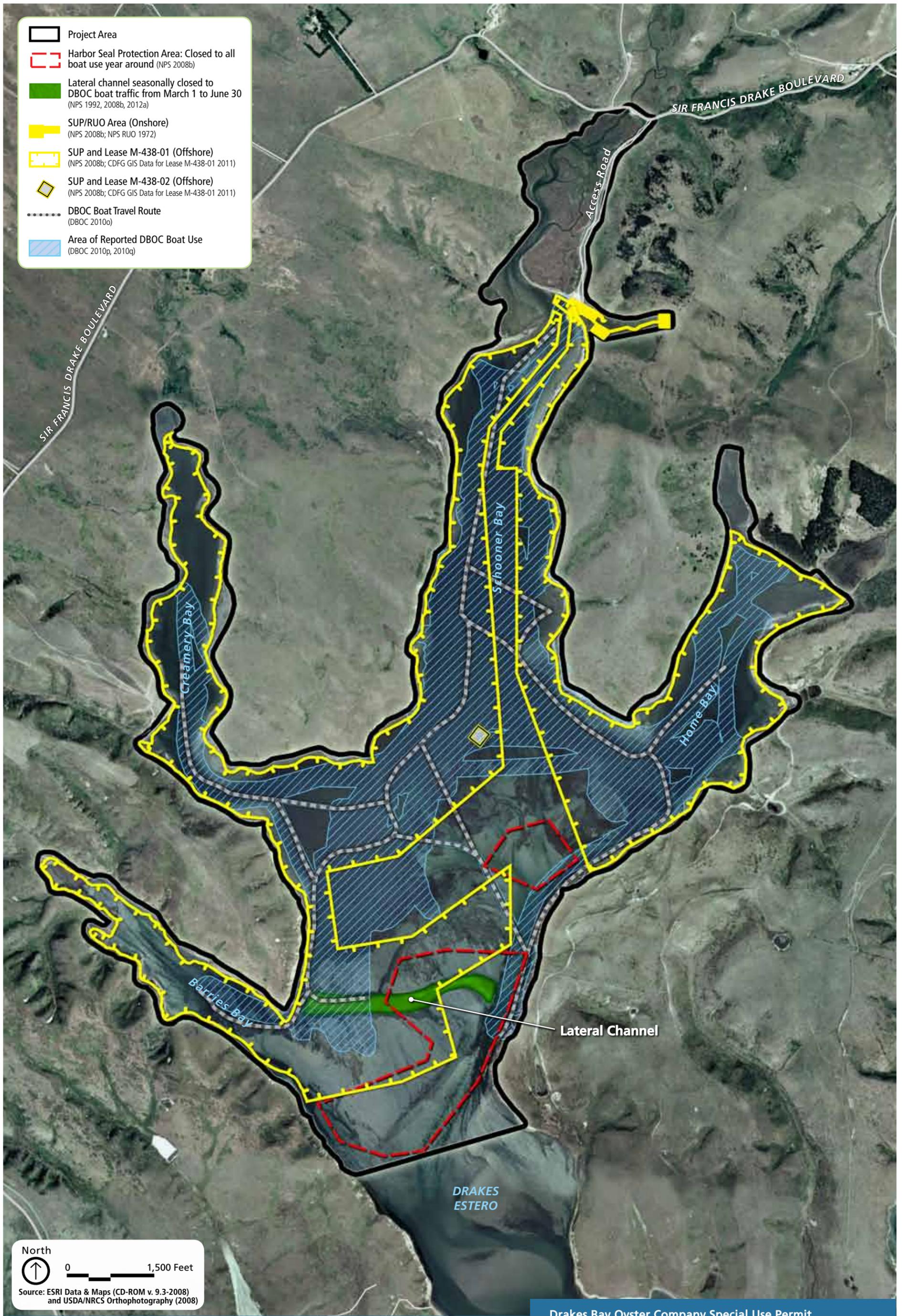
Aerial photo of Drakes Estero (2007) showing boat tracks through algae. (Photo courtesy of Robert Campbell.)

When not in use, these boats are docked at the main dock described in the section “Onshore Operations and Facilities” below. DBOC also has two nonmotorized barges (8 feet by 30 feet and 8 feet by 17 feet) that are often used to transport materials (including shellfish) within Drakes Estero. DBOC has not established permanent moorings (i.e., locations where vessels are secured to the bottom) for these barges in Drakes Estero. DBOC states that the barges are anchored in deep water or tied to the dock. Each barge has its own anchor (DBOC 2011f^{xlv}). DBOC submitted the same boat travel route to NPS and CCC to describe boat use in Drakes Estero (DBOC 2008f^{xlvi}, 2010o^{xlvii}, 2010s^{xlviii}). This route is displayed (with other information discussed below) on figure 2-2; however, some variation in travel routes is expected based on tides, weather, eelgrass, and harbor seal restrictions. Many of the beds are only exposed at lower tides requiring boat access at that time. DBOC has asserted a preference for avoiding eelgrass but claims that this is not always possible (DBOC [Lunny], pers. comm., 2011h). Although section 4(b)(iv) of the 2008 NPS SUP required that DBOC submit a vessel transit plan within 60 days of the signing of the SUP (the SUP was signed on April 22, 2008), DBOC has not yet done so.

In order to protect harbor seals, the 2008 SUP included a harbor seal protection protocol that restricts DBOC boat travel (and areas of operation in general). This protocol prohibits DBOC operations (including placement of bags) within the established harbor seal protection areas (see figure 2-1) and requires a number of other restrictions to minimize disturbance of harbor seals by DBOC staff and boats, including seasonal closure of the lateral channel and maintenance of a 100-yard buffer from any hauled-out harbor seal at any time. Since the publication of the DEIS, DBOC has stated that since 1992 DBOC has routinely driven its boats through the western end of the lateral channel during the seasonal closure period (DBOC 2012e^{xlix}). DBOC asserts that its use of the western end of the lateral channel is not prohibited by the 2008 SUP. NPS and CCC disagree with DBOC’s interpretation of this provision of the SUP (CCC 2012a^l, NPS 2012a^{li}). NPS provided a letter to DBOC on January 23, 2012 to clearly state that the plain meaning of section 4(b)(vii) of the SUP is that the entirety of the lateral channel is closed during the harbor seal breeding season (March 1 to June 30) and that the 1992 protocol was not incorporated into the final signed 2008 SUP (NPS 2012a^{lii}). CCC’s February 1, 2012 letter to DBOC reiterates these facts and notes that this constitutes a violation of sections 5.0, 6.0, and 7.0 of the Consent Order (CCC 2012a^{liii}).

In October 2010, NPS requested a vessel transit plan (including a list and description of vessels used as well as the frequency with which these vessels are used) from DBOC (NPS 2010h^{liv}). In November 2010, DBOC provided boat transit information to the NPS, including the general boat route referenced above and shown on figure 2-2 along with two days of GPS tracking data (January 18, 2010 and June 7, 2010) for its boats (DBOC 2010p^{lv}, 2010q^{lvi}). Although these data are limited, it is the only spatial data provided by to the NPS and is assumed to be representative of current DBOC boat operations. The NPS requested more comprehensive boat tracking data (NPS 2011p^{lvii}); however, DBOC declined to provide additional spatial data (DBOC 2011f^{lviii}). DBOC gathered this data using Garmin GPS Map 76 handheld GPS units, which are used to spatially track each boat’s location and path at all times.

Figure 2-2 shows the linear boat travel route combined with a compilation of the GPS data for the two days of data provided to NPS by DBOC (DBOC 2010p^{lix}, 2010q^{lx}). The data was provided in PDF format and at a relatively coarse resolution. In addition, the width of the boat use area is shown approximately 60 feet wide, which may represent an area greater than where boats actually travel. Additionally, because only two days of data were provided, the total area of actual use is unknown. The total area of boat use estimated by this compilation of available data is approximately 740 acres.



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FIGURE 2-2
DBOC Boat Use



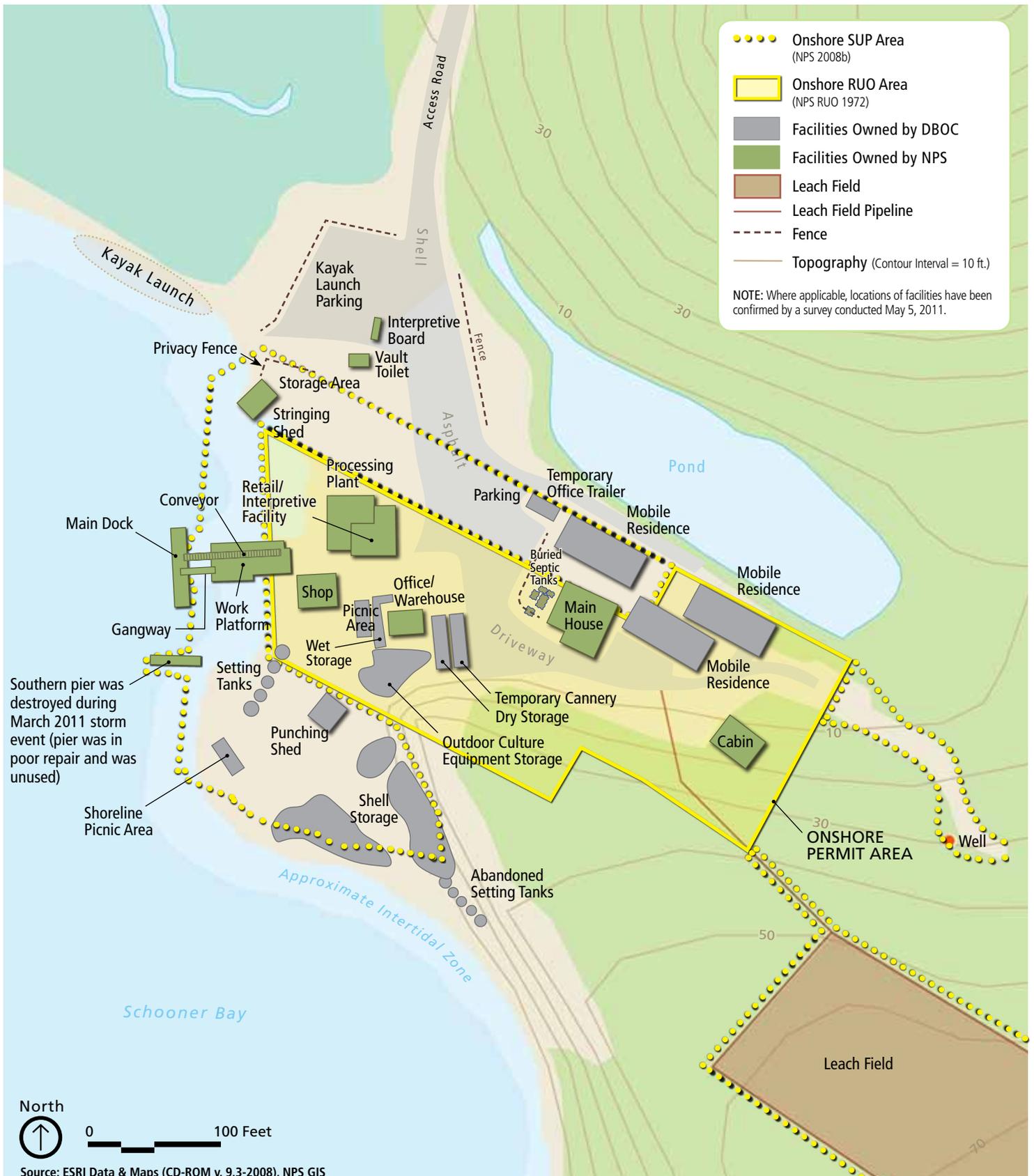
As shown on figure 2-2, some boat travel takes place outside the boundaries of the current permit area. The purpose of most of the DBOC boat travel outside the SUP boundaries is to cross between Parcel 1 and Parcel 2 of Lease M-438-01 and to directly access culture beds. DBOC is responsible for monitoring domoic acid and paralytic shellfish poisoning (PSP) biotoxins in the shellfish growing areas (CDPH 2012). Station 13 may be located outside the permit area (exact coordinates are unknown and have therefore not been compared to the permit area boundaries), and access to stations 17, 18, and 19 may be complicated by closure of the lateral channel to DBOC boat use during harbor seal pupping season. (Additional detail on water sampling is contained in the water quality section of chapter 3.)

The overlay on figure 2-2 also shows use of the lateral channel. Although the area of boat operation is a compilation of boat travel on January 18, 2010 and June 7, 2010, the June 7, 2010 did include travel in the lateral channel, which violated the harbor seal protocol included in the 2008 SUP (DBOC 2010p^{lxi}). The lateral channel is the entire channel between the main channel and the west channel (NPS 2012a^{lxii}). The lateral channel was defined graphically during the development of a 1992 protocol for harbor seal protection agreement to be applied to JOC operations in Drakes Estero (NPS 1992^{lxiii}). Although the harbor seal protection protocol included in 2008 SUP for DBOC's operations supersedes the 1992 agreement, the definition of the lateral channel to remained the same.

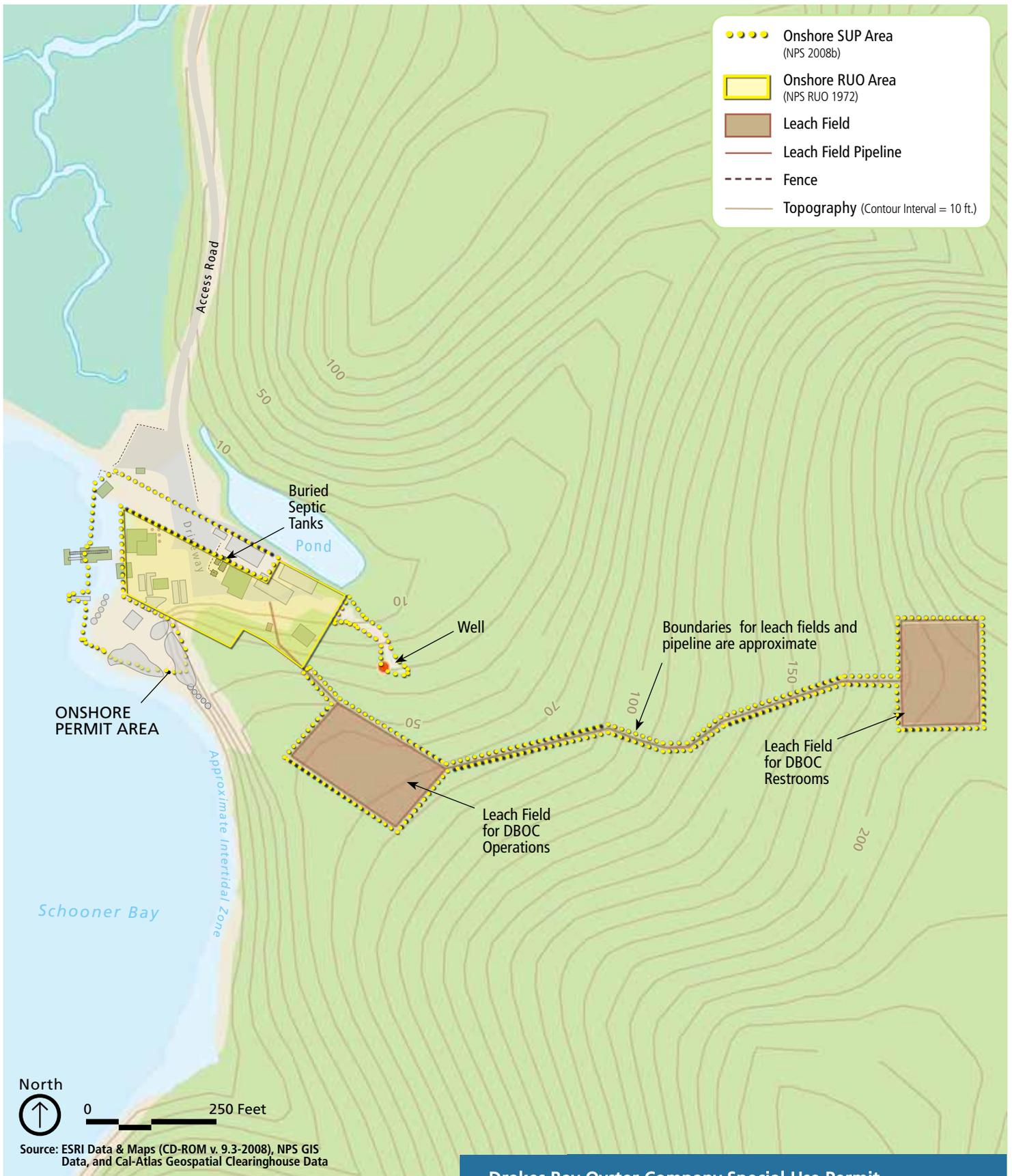
Onshore Operations and Facilities

DBOC onshore facilities support the processing, sale, and initial stages of shellfish culture (figure 2-3). For the most part, these facilities are located within the 1.5 acres of the original RUO, the additional 1.1 acres established with the issuance of the 2008 SUP, and 2.0 acres encompassing the well and septic areas (shown on figure 2-4). DBOC facilities currently outside the authorized area include unused setting tanks and may also include portions of the oyster shell storage mounds. The existing onshore facilities and their approximate size, ownership, and purpose are summarized in table 2-3. Some of DBOC's existing facilities have not been approved by the NPS or have only been granted temporary approval. Specifically, NPS provided authorization for temporary structures (NPS 2005^{lxiv}); however, it was assumed that these items would be temporary and would be removed as soon as they could be replaced by permanent structures.

The issuance of the 2008 SUP did not result in retroactive approval of facilities and operations that had not been previously approved by the NPS. The 2008 SUP cover page indicates that NEPA compliance for the 2008 SUP was "pending." Before the NPS could fully initiate the NEPA document contemplated by the parties in 2008, Congress enacted Section 124. This EIS is now the vehicle in which NPS is considering different operating scenarios for DBOC, as described under each alternative later in this chapter. Those items that have not previously been approved through a NEPA process are noted in table 2-3 below. DBOC is in the process of acquiring after-the-fact authorization for some unpermitted buildings/structures to comply with coastal development regulations. In order for these facilities to be approved by CCC, approval also must be given by the NPS. These unpermitted facilities, constructed without first obtaining a coastal development permit from the CCC and without approval from the NPS, are identified and evaluated within the project alternatives.



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**FIGURE 2-4
Existing Water and Septic Utilities**

TABLE 2-3. SUMMARY OF EXISTING ONSHORE FACILITIES AND OWNERSHIP STATUS

Building/Structure	Approximate Size* (feet)	Ownership	Purpose
Processing Plant	40 × 48	NPS [†]	The rear half of this building houses the inside setting tanks and the single oyster-packing facilities. The front half houses the retail and interpretive areas.
Office/Warehouse	16 × 24	NPS [†]	Due to its poor condition, this structure is currently only used for storage.
Temporary Office Trailer	8 × 20	DBOC	This structure serves as a business office.
Punching Shed	20 × 20	DBOC	This shed is used for preparation of shells for Japanese hanging culture.
Temporary Cannery [‡]	8 × 40	DBOC	This shipping container houses the cannery facility.
Temporary Storage [‡]	8 × 40	DBOC	This shipping container is used for dry storage.
Setting Tanks [‡] (5 units)	10.5 diameter (2 units) 8 diameter (3 units)	DBOC	These five fiberglass tanks are used for growing larvae to a size where they can be transferred to Drakes Estero.
Main Dock and Ramps [§]	Floating dock: 12 × 60 Two ramps: 4 × 15	NPS	This is the main dock serving DBOC boats. It is composed of a floating dock connected to an onshore work platform by a gangway and a conveyor.
Work Platform [§]	Pier: 55 × 24	NPS	The platform is where harvested oysters are initially cleaned and sorted.
Southern Pier	6 × 24	NPS (no longer applicable)	This small pier was destroyed in a recent (March 2011) high wind event. DBOC does not plan to rebuild this pier (DBOC 2011b ^{kw}).
Shop	16 × 20	NPS [†]	This one-story structure serves as an employee break room.
Stringing Shed	17 × 24 (with 13 × 12 appendage)	NPS	This open-air shed is used for stringing punched shells onto wires for Japanese hanging culture.
Main House	40 × 50	NPS [†]	This house is the operation manager's residence.
Cabin	24 × 35	NPS [†]	This cabin provides employee housing.
Mobile Homes (3)	24 × 60 (each)	DBOC	These structures provide employee housing.
Picnic Areas [‡]	12 tables	DBOC	DBOC provides casual picnic areas for visitors both in a centralized area next to the office/warehouse and along the shoreline.

Note: Any new facility constructed by DBOC under a new SUP is considered personal property as defined by the SUP and removal would be the responsibility of DBOC at the expiration of the SUP.

* Sources for sizes are NPS measurements during a March 22, 2011, site visit and DBOC coastal development permit application materials (DBOC 2009b^{kw}).

[†] NPS ownership is according to item purchased from JOC, itemized in the August 25, 1972, Public Voucher for Purchases and Services Other Than Personal (Requisition Number CX800032073).

[‡] These structures and facilities have not been approved through a NEPA process. The NPS approved the temporary cannery and temporary storage in 2005 on the basis that their use was temporary.

[§] These facilities were damaged during a high wind event in March 2011. Any replacement of these facilities that is not consistent with the existing structure in terms of footprint and materials would be considered personal property of DBOC. DBOC would have to remove such structures at the end of the permit term. Following the high wind event, DBOC sought emergency approval to construct a new concrete work platform and dock, but withdrew the application in May 2011.



Onshore DBOC facilities (photo taken before the March 2011 storm event). (Photo courtesy of Janene Caywood.)

DBOC imports shellfish from off-site growers. DBOC reports that it imports shellfish in the form of larvae (and seed) from CDFG-certified sources in compliance with a “Long-term Permit to Import Live Aquatic Animals into California” issued by the CDFG. CDFG-certified hatcheries are located in Hawaii and along the U.S. west coast. DBOC’s 2006 proof of use report shows that 1 million Manila clam seeds were imported and planted in Lease M-438-02 (CDFG 2006). These seeds were acquired from Kona Coast Shellfish in Hawaii. For Pacific oyster larvae and seed, CDFG generally uses hatcheries on the west coast. For instance, for 2011, DBOC holds permits to import larvae/seed from Taylor Shellfish Farms in Washington (Permit MR-L-10-029) and Whiskey Creek Shellfish Hatchery in Oregon (Permit MR-L-10-028). However, it has also used seed from Coast Seafoods Company in California and Kona Coast Shellfish in Hawaii. The sources from which CDFG has authorized DBOC to import larvae and/or seed are summarized in table 2-4.

TABLE 2-4. DBOC LONG-TERM PERMITS TO IMPORT LIVE AQUATIC ANIMALS INTO CALIFORNIA

Permit Number	Date of Issuance ^a	Supplier	City	State	Source	Species
MR-L-10-029	12/07/2010	Taylor Shellfish Farms	Shelton	WA	Taylor Shellfish Farms	Pacific oyster
MR-L-10-028	12/07/2010	Whiskey Creek Shellfish	Tillamook	OR	Whiskey Creek Shellfish	Pacific oyster larvae
MR-L-08-038	09/02/2008	Coast Seafoods Company	Bellevue	WA	Quilcene Hatchery	Pacific oyster larvae and seed
MR-L-08-039	09/02/2008	Whiskey Creek Shellfish	Tillamook	OR	Whiskey Creek Shellfish	Pacific oyster larvae
MR-L-08-044	10/27/2008	Coast Seafoods Company	Kailua-Kona	HI	Coast Seafoods Company	Pacific oyster
MR-L-07-014	06/23/2007	Whiskey Creek Shellfish	Tillamook	OR	Whiskey Creek Shellfish	Pacific oyster larvae
MR-L-07-018	08/03/2007	Coast Seafoods Company	Bellevue	WA	Quilcene Hatchery	Pacific oyster larvae
MR-L-05-012	06/09/2005	Taylor Shellfish Farms	Shelton	WA	Taylor Shellfish Farms	Pacific oyster

Sources: CDFG Long-term Permits to Import Live Aquatic Animals into California.

^a Permits are good for 1 year from date of issue.

The setting tanks located onshore provide a location for remote setting. These tanks have not been permitted by NPS or CCC. In 2005, DBOC removed JOC's setting building, as had been mandated by the Johnson Order (CCC-03-CD-12); however, during a site visit the following year, CCC staff noted that new setting tanks had been placed in this approximate location. CCC informed DBOC that the removal of this building required removal of building's contents, as well (CCC 2006^{lxvii}). Remote setting is a human-controlled process by which shellfish larvae imported for DBOC commercial shellfish operations are grown on site to a stage of maturity marked by attachment to cultch material, at which point the larvae become seed. The larval stage is the immature stage of development that occurs immediately after successful reproduction and egg fertilization. In the wild, larvae are carried by currents and have a free-swimming, mobile existence. The beginning of the seed stage is marked by the end of this mobile larval phase, when larvae develop anatomical "feet" used to attach to an immobile substrate. Once attached, shellfish larvae have reached maximum development for the larval stage and seed development begins. In essence, the term "seed" refers to a developmentally young shellfish that has become sessile (immobile), with no specific definition as to size (Quayle 1988). Manila clams are imported as seed and do not require remote setting. Seeds, placed within bags or trays, can be placed directly within Drakes Estero. While growing oyster larvae in the onshore setting tanks, DBOC withdraws water from Drakes Estero for remote setting. Single oyster setting takes place in the processing building using microcultch (ground shells; described below). The water used for setting is withdrawn from Drakes Estero, filtered, heated to 23 to 25 degrees Celsius (73 to 77 degrees Fahrenheit), and eventually discharged via underground pipes into Drakes Estero (DBOC [Lunny], pers. comm., 2011h). DBOC indicates that microalgae (Instant Algae® Shellfish Diet 1800™) is occasionally added to the water (2012b^{lxviii}).

Cluster oyster setting takes place in the five outdoor setting tanks (two of these setting tanks are 10 feet in diameter and 4 feet deep and three of the tanks are 7 feet in diameter and 4 feet deep). After a four-day setting period at an elevated temperature, water from Drakes Estero is circulated through these tanks continuously at a rate of about 5 gallons per minute, with no need for added nutrients. On about day 7, the tanks are discharged directly into Drakes Estero (DBOC 2010f^{lxix}).

DBOC also has a wet storage facility used for holding live shellfish. This storage includes an above-ground 5-foot by 48-foot concrete slab, plumbing, and an underground tank (DBOC 2011i^{lxx}, 2012b^{lxxi}). The location of these items is indicated on figure 2-3 as "wet storage." DBOC provided example photos of these items, as shown below.



Concrete slab for wet storage
(Photo courtesy of DBOC)



Live shellfish holding tank
(Photo courtesy of DBOC)

DBOC stores large piles of shell onshore. Because DBOC is constantly adding to and removing shell from these piles, their boundaries are not completely stationary. The southern shell pile (on the right in the picture below) may at times spill over the permit boundary. Deposition of shell material at the site prior to DBOC occupancy has resulted in progressive fill of Drakes Estero and the marsh to the northeast of the onshore permit boundary. Placement of shell debris in the vicinity of the existing pond took place primarily between the 1950s and 1980s. Currently, shells are stored on site primarily for use in cultivation. Holes are punched in the left valves (shells) for use in Japanese hanging culture. Right valves (shells) are ground and used for microcultch, which is used for single oyster culture. According to DBOC, some of the shell has been donated and sold offsite (DBOC [Lunny], pers. comm., 2011h). French tubes are also stored on site prior to use. DBOC uses a small forklift (with a 60-horsepower engine) to move pallets of oyster shell and other cultivation materials.



Oyster shells are stockpiled on site (September 2010). Note punching shed to the left. (Photo courtesy of VHB.)

DBOC packages its shellfish on site and operates the only on-site shellfish cannery in California. Approximately 25 percent of the shellfish harvested is sold in jars (the remaining 75 percent is sold live in

the shell) (DBOC 2012b^{lxxii}). Shellfish and culture equipment are cleaned by scrubbing with seawater by hand or by pressurized washers along the conveyor belt when they are brought onshore from Drakes Estero. The water used in this process is drawn from and discharged directly into Drakes Estero. Cluster Pacific oysters (particularly those grown using the Japanese hanging culture method) must be broken apart with pneumatic hammers; French tube culture clusters can generally be broken apart with a mallet.

The breaking apart of clusters and rinsing of shellfish as they are brought in from Drakes Estero takes place at the main dock, the conveyors, and the attached work platform/pier. These structures were badly damaged in a March 2011 storm event. DBOC proposed replacement of the dock following the storm (DBOC 2011b^{lxxiii}). As this EIS was already in progress when the storm event occurred, the replacement of the dock, work platform, and associated ramps and conveyors are included in all action alternatives (described in more detail later in this chapter). Currently, all debris washed off these platforms returns directly to Drakes Estero.

Packing methods differ depending on the final product. Single oysters are placed by hand into containers and taken to one of the two on-site processing facilities. Because single oysters remain closed, they are processed in the back of the old processing plant as well as in the temporary cannery in the shipping container. High-quality oysters are separated for distribution to the raw half-shell market, while lower-quality oysters are separated for other single-shell distribution needs. Both are packed in mesh bags and stored in the walk-in refrigerator in the processing room.

Individual oysters are separated manually by size (oysters too small for distribution are placed back in Drakes Estero to grow further). Individual oysters are generally only suitable for shucked packing, which takes place in the cannery. Cleaned oysters are selected according to size and packed into jars with fresh well water. Cleaning and packing of Manila clams is the same as described for the single Pacific oysters. DBOC sells its shellfish and “complementary food items” on site in the retail area of the processing plant, as allowed in the RUO. Some visitors purchasing food items at the site currently consume them on site at the 12 picnic tables provided by DBOC (DBOC 2012c^{lxxiv}). Picnic tables in the SUP area have not been authorized by NPS. Approximately 40 percent of DBOC income is from onsite retail sales, 40 percent is sold directly to local markets and restaurants, 18 percent is sold to Tomales Bay shellfish growers, and 2 percent is sold through a wholesale seafood distributor based in San Francisco (DBOC 2012b^{lxxv}).

Unlined parking spaces for approximately 10 to 15 vehicles are provided in an asphalt parking lot in front of the retail facility. Some of the paving on site was conducted by DBOC prior to the signing of the 2008 SUP and without NPS or CCC approval (NPS 2006e^{lxxvi}, CCC 2006^{lxxvii}). DBOC deliveries to local markets and restaurants are made using one of the company’s two trucks: a 0.75 ton pickup truck and a 1.5-ton refrigerated box truck. Currently, Manila clams are only sold on site (DBOC [Lunny], pers. comm., 2011h).

The 2008 SUP and the 1972 RUO allow DBOC to provide interpretation of shellfish cultivation to the public in the onshore permit area. Formal tours may range from 5 people to school groups of 20. DBOC also provides informal presentations of the commercial operation and history of oyster cultivation in Drakes Estero. Tours are limited to onshore activities. Tours on the water are not allowed under existing NPS authorizations. Certain interpretive activities are subject to NPS approval and may require a separate SUP.

Five buildings on site provide staff housing with a total of 14 bedrooms in two permanent structures and three mobile homes to house staff (DBOC 2010k^{xxviii}). The two permanent structures are the main house and the cabin. The main house serves as the operation manager's residence.

ELEMENTS COMMON TO ALL ALTERNATIVES

There are a number of elements common to all alternatives. They are as follows:

- The current NPS authorizations, which consist of the RUO and the 2008 SUP, expire on November 30, 2012.
- Subsequent to expiration of the SUP, the congressionally designated potential wilderness would be converted to congressionally designated wilderness, although the year in which this takes place would vary between the no-action (2012) and action alternatives (2022).
- NPS would continue to maintain the existing NPS facilities within the project area: the access road, a gravel parking lot, vault toilet, and an interpretive board.
- When NPS's authorizations to DBOC expire (either 2012 or 2022), DBOC would remain responsible for the removal of those buildings and structures owned by DBOC as listed in table 2-3 (i.e., the temporary office trailer, the punching shed, the temporary cannery, temporary storage, setting tanks, the three mobile homes, and the picnic facilities) and all personal property (including any improvements made to the area since 1972). The year in which these removal and restoration activities would take place would vary between the no-action (2012) and action alternatives (2022).
 - DBOC would be responsible for removing all shellfish and shellfish infrastructure including racks from within Drakes Estero as part of the closeout of the permit. There are a number of approaches to remove the racks, ranging from import of a small barge with hydraulic lift to pull the posts to deconstruction using existing barge and boats. While most of the removal activities would be manual, mechanized boats would be required for the duration of the removal activities. It is estimated that approximately 4,700 posts (2-inch by 6-inch boards) and more than 179,000 linear feet of pressure-treated lumber will be removed and disposed of properly. Standard best management practices (BMPs) for sediment control and habitat protection, such as the use of silt curtains, would be employed during removal of the rack structures. Divers would also remove by hand any large debris that had fallen beneath the racks such as large chunks of shell or other remains of oyster strings. It is likely that the removal may take 2 to 3 months. The timing of the rack removal would occur outside of the harbor seal closure period (March 1-June 30).
 - Removal of the bag infrastructure would likely occur in conjunction with harvest of the shellfish from Drakes Estero upon closeout. If conducted separately, it is estimated recovery of all anchor materials and lines could take up to 2 to 4 weeks and would require the use of boats and barges for hauling.
 - DBOC would also be required to restore the affected areas to good order and condition by the end of the permit term, as specified by section 23(a) of the SUP.
- For any ground disturbing activities conducted within the onshore permit area, archeological identification studies, including construction monitoring by a qualified archeologist, would be required to determine the presence of unknown or buried archeological resources. In the event

that unknown archeological resources are discovered during construction, the park's Cultural Resources Division would be notified immediately and work in the immediate area would cease until the discovery is evaluated by a qualified archeologist. The discovery process defined by 36 CFR 800.13, the implementing regulations for NHPA (16 U.S.C. 470), would be applied.

- Common to all alternatives, baseline surveys and monitoring of resources would occur to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (e.g., tunicates, Manila clams, Olympia oyster, etc.), and eelgrass. These surveys and results of monitoring would provide site-specific data and further increase understanding of the natural ecological processes within Drakes Estero, thus improving the long-term management of Drakes Estero. Some of the baseline surveys and monitoring listed below would be accomplished through the hiring of two seasonal employees, as described in the NPS operations section.
 1. Benthic and infaunal communities
 - a. Map and quantify the extent of non-native within Drakes Estero, specifically:
 - i. Establish a species list
 - ii. Identify non-native species of management priority
 - iii. Identify extent of Manila clam establishment within Drakes Estero
 - iv. *Didemnum vexillum*
 1. Assess overall distribution within Drakes Estero
 2. Evaluate distribution and annual cycle of *Didemnum* on hard structure and soft substrate
 3. Evaluate literature sources for effectiveness of *Didemnum* removal techniques
 4. Survey eelgrass for tunicates to determine if there may be any effects of tunicate "source" on eelgrass tunicate loads.
 5. Survey *Didemnum* density consistent with distance from rack locations.
 - b. Map and quantify the extent of native species within Drakes Estero, including:
 - i. Distribution of Olympia oyster in Drakes Estero
 2. Eelgrass
 - a. Assess eelgrass dynamics within Drakes Estero based on review of historic aerial images
 - b. Document and evaluate recovery of eelgrass scars from propellers
 - i. Identify rate of regrowth in relation to depth and extent of scarring
 - ii. Identify species of eelgrass present in the regrowth area
 3. Quantitative comparisons of Drakes Estero and Estero de Limantour
 - a. Water residence time
 - b. Presence/absence of non-native species

ALTERNATIVE A: NO NEW SPECIAL USE PERMIT—CONVERSION TO WILDERNESS (NO-ACTION)

The CEQ's NEPA regulations require the alternatives chapter in an EIS to "include the alternative of no action" (40 CFR section 1502.14). The Department of the Interior's NEPA regulations, 43 CFR section 46.30, provide two interpretations for the term "no action." The first interpretation is that no action "may mean 'no change' from a current management direction or level of management intensity (e.g., if no ground-disturbance is currently underway, no action means no ground-disturbance)." The second interpretation "may mean 'no project' in cases where a new project is proposed for implementation." This EIS contains alternatives satisfying both of these interpretations. Alternative A is a "no project" alternative. Alternative B essentially represents continuation of the current level of management intensity.

The CEQ's Forty Most Asked Questions provide additional guidance to agencies in determining which no action formulation is most appropriate in a particular EIS. The CEQ explains that the proper type of no action alternative to be considered depends on the nature of the proposal being evaluated. The first situation typically involves an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. The second type of "no action," is illustrated by situations involving federal decisions on proposals for projects. For this type of "no action" alternative, the proposed activity would not take place and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

This second situation is more relevant to this EIS, which analyzes a federal decision on DBOC's proposal. DBOC has requested a new permit from NPS so that it may continue to operate after November 30, 2012. Absent federal action on DBOC's request for a new permit, the RUO and SUP would expire on November 30, 2012 and DBOC's operation would cease. This EIS therefore compares the effects of taking no action (i.e., no new permit for DBOC under Section 124) to Alternatives B, C, and D, which involve issuance of a new permit under Section 124.

Under alternative A, the SUP and RUO would expire on November 30, 2012. The Secretary would not take action to issue a permit to DBOC under section 124 of PL 111-88.

DBOC OPERATIONS AND FACILITIES

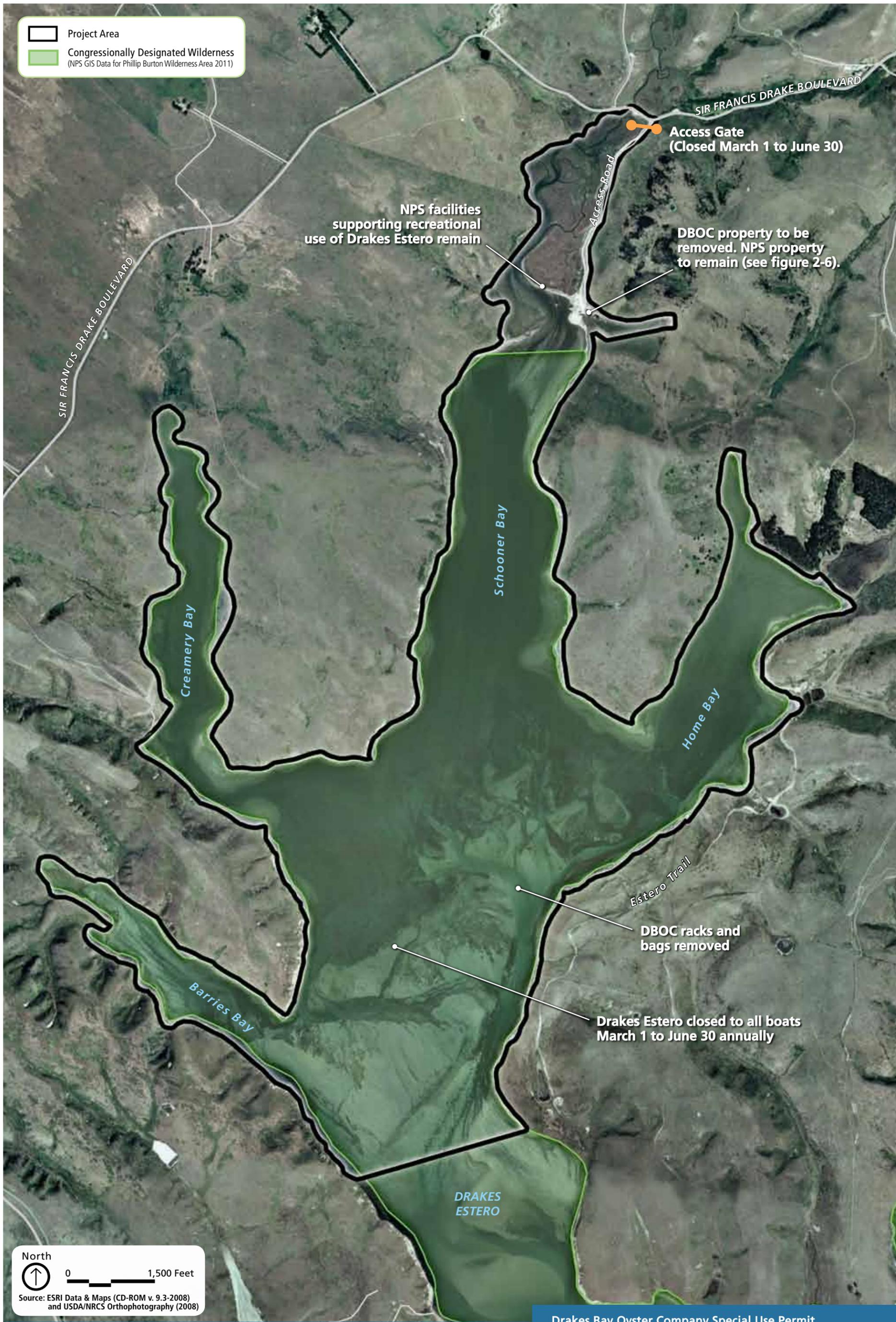
DBOC would cease to operate within the Seashore, and DBOC would remove those buildings and structures owned by DBOC as listed in table 2-3. The structures that would be removed are the temporary office trailer, one of the mobile residences, the punching shed, the picnic tables, and the setting tanks, all of which are included in the SUP area. Additionally, DBOC would remove all personal property associated with the oyster operation (including all racks, bags, and any other commercial shellfish operations-related items in Drakes Estero, as well as the shell mounds) from Drakes Estero and the adjacent uplands, and DBOC would restore the affected areas to good order and condition, as set forth in the existing SUP and RUO.

The removal of personal property within the 1.5 acre RUO area is governed by Paragraph 12 of the RUO.

Paragraph 12 states the reserver “shall remove all structures and improvements placed on the premises during the period of its reservation. Any such property not removed within 90 days after the expiration of the Vendor’s reservation shall be presumed to have been abandoned and shall ... become the property of the United States of America, but this shall in no way relieve the Vendor of liability for the cost of removal of such property from the reserved premises.” This 90 day window is only applicable within the 1.5 acre RUO. It does not apply to the lands and waters covered by the SUP. Section 23 of the SUP requires DBOC to remove all of its personal property from the SUP area at the conclusion of the permit term, which is November 30, 2012.

Amendment 2 to the 2004 Lease M-438-01 renewal required the establishment of an escrow account for removal of commercial shellfish operation equipment from the lease area “as a financial guarantee of growing structure or other lease improvement removal and/or cleanup expense in the event that the aforementioned aquaculture lease is abandoned or otherwise terminated” (CDFG 2005a). At the time of this EIS, CDFG has indicated that the account is not up to date and is working with DBOC to establish a new agreement for this issue (CDFG 2011b^{lxxix}).

Cessation of commercial mariculture activities in Drakes Estero would end all nonconforming uses that are inconsistent with wilderness designation. Upon its cessation, NPS would convert the congressionally designated potential wilderness to congressionally designated wilderness, as described below. Figures 2-5 and 2-6 show the conditions both offshore and onshore following removal of commercial shellfish activities and structures under the no-action alternative.



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 2-5
Alternative A: No New Special Use Permit – Conversion to Wilderness (No-action) (Offshore Conditions)



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 2-6
Alternative A: No New Special Use Permit – Conversion to Wilderness (No-action) (Onshore Conditions)



National Park Service
 U.S. Department of the Interior
 Point Reyes National Seashore

OTHER NPS OPERATIONS AND FACILITIES IN THE PROJECT AREA

Within the SUP area, some structures owned by NPS (all of which are outside the congressionally designated potential wilderness area) would remain on site and others would be removed. The main dock, work platform, stringing shed, and southern pier, damaged in a March 2011 storm event, would be removed. A determination of eligibility conducted for the structures within the project area concluded that the structures are not eligible for listing on the National Register due to lack of historic integrity (Caywood and Hagen 2011). In a letter dated August 4, 2011, SHPO concurred with this finding (see appendix D). Therefore, removal of these structures would not require approval from the SHPO. The remaining permanent structures consist of the processing plant, the shop, the office/warehouse, the main house, and the cabin. The NPS would evaluate these structures for removal or reuse in a future planning effort.

Outside of the SUP area, NPS would continue to maintain existing NPS facilities (the access road, a gravel parking lot, a vault toilet, and an interpretive board) for visitors. A gate would be installed at the intersection of the access road with Sir Francis Drake Boulevard to prevent all nonmotorized boat use (e.g., kayak, canoe) within Drakes Estero during harbor seal pupping season (March 1 to June 30). This would not represent a change in visitor use policy, as visitors would continue to have access to the shoreline and beach areas of Drakes Estero. The gate would provide a more efficient enforcement method to prevent nonmotorized boat use during the seasonal closure. Signs associated with the gate would inform the public as to the reasons for the closure. The gate would be standard and the installation procedures would include digging of holes for the posts, anchorage of those posts, and hanging of the gate on the posts. The gate would be tied in to a split rail fence, similar to that at the overlook just to the west along Sir Francis Drake Blvd.

Cessation of commercial shellfish operations in Drakes Estero would end all uses that are inconsistent with full wilderness designation. This would allow the NPS to convert the approximately 1,363 acres of congressionally designated potential wilderness in Drakes Estero to congressionally designated wilderness. A notice would be published in the Federal Register attesting to the fact that all nonconforming uses of the congressionally designated potential wilderness area have ceased. Conversion to congressionally designated wilderness would be effective on the date of notice publication (PL 94-567). Recreational use of Drakes Estero by nonmotorized watercraft such as canoes and kayaks would continue to be allowed from July 1 to February 28, with all of Drakes Estero closed to recreational boaters during harbor seal pupping season, March 1 to June 30. Administrative use of motorized boats within Drakes Estero would be subject to evaluation under minimum requirements and minimum tool determination processes as required by the Wilderness Act. In each case, nonmotorized alternatives would be evaluated to determine whether they meet the specific management objective

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

There are a number of elements that would be common to all action alternatives. They are summarized here and restated under each alternative.

Under all action alternatives, a new SUP authorized under section 124 of PL 111-88 would be issued to DBOC for a period of 10 years. Because these alternatives include the authorization for DBOC to continue operating for 10 years, the NPS would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness for 10 years. The new SUP would expire on November 30, 2022. No extensions or renewals would be issued because section 124 only authorizes one 10-year permit. The new SUP would be based on the existing SUP, would incorporate requirements as identified in this EIS, and would incorporate the area of the RUO into the SUP. In keeping with section 124's direction that the new authorizing instrument would be a SUP, a new RUO would not be issued.

DBOC's ability to obtain and operate under a new SUP would also be contingent on DBOC's compliance with all applicable laws. Prior to implementation of any development activities, DBOC shall obtain all necessary permits and approvals, as outlined below.

Under all action alternatives, as a condition of permit issuance, DBOC would be required to relinquish its state water bottom lease. As explained in Chapter 1, tidal and subtidal lands within Drakes Estero are owned in fee by the U. S. These lands were conveyed by the State of California to the U. S. in 1965. While California retained to the people the right to fish in Drakes Estero, this right extends only to the public's right to take wild fish (CDFG 2007b^{lxxx}, DOI 2012a^{lxxxii}). Aquaculture products are private property and so cannot be part of a public fishery. Because the State of California did not reserve authority to issue aquaculture leases in the Estero, the legal authority to determine whether DBOC may use the water bottoms in the Estero rests with the NPS, not the Fish and Game Commission. Therefore, should the Secretary issue a permit to DBOC under section 124, as a condition of receiving that permit, DBOC would be required to surrender its state water bottom lease effective November 30, 2012. DBOC would thereafter operate under the terms of the NPS permit. Relevant provisions of the existing CDFG leases would be incorporated into the SUP including repair and cleanup requirements, payment requirements, the maintenance of an escrow account as "a financial guarantee of growing structure removal and/or cleanup expense in the event the lease is abandoned or otherwise terminated", and rights of inspection (including premises, equipment and books pertaining to cultivation). This would ensure that certain provisions relating to DBOC operations that are currently incorporated into the SUP by reference remain in force. CDFG would retain authority under Fish and Game Code to regulate the stocking of aquatic organisms, brood stock acquisition, disease control, importation of aquatic organisms into the state, and the transfer of organisms between water bodies.

Under section 124, DBOC must pay the U.S. the fair market value of the federal property if a new 10-year SUP is issued to DBOC. A permit under section 124 would encompass the federally owned onshore and offshore areas used by DBOC. If the state water bottom lease continued after November 30, 2012, DBOC would be required to make lease payments to the state in addition to making fair market value payments to the U. S. This situation is avoided through the termination of the state water bottom lease. This new regulatory framework would be applied to DBOC operations if one of the action alternatives described in this EIS is selected by the Secretary.

Under all action alternatives, NPS would exercise oversight of DBOC operations in accordance with the terms of the new permit. Section 2(b) of the 2008 SUP, establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the Premises. Additional mitigations/permit conditions beyond those listed below may be required by other agencies in order to obtain required local, state and federal permits.

The 2008 SUP includes a number of conditions that address aquaculture operations in Drakes Estero. Pursuant to Section 124, which provides the Secretary the discretionary authority to issue a special use permit with the same terms and conditions as the existing authorizations, the following conditions from the 2008 SUP are included as elements common to all action alternatives:

- A cap on production levels (Section 4b[i])
- No construction of additional aquaculture racks and/or cultivation infrastructure without prior approval of the NPS (Section 4b[ii])
- Avoidance of eelgrass when placing bags (Section 4b[iii])
- Submission of a boating operations plan including dedicated navigation routes chosen to minimize impacts to eelgrass beds (Section 4b[iv])
- Importation of shellfish in the form of larvae and seed certified by CDFG (Section 4b[v])
- Species of shellfish beyond those described in the existing leases may not be introduced without prior written approval of the NPS (Section 4b[vi])
- Avoid disturbance to marine mammals and marine mammal haul-out sites, including maintaining a distance of at least 100 yards from hauled out seals and conformance with the “Drakes Estero Aquaculture and Harbor Seal Protection Protocol” (Section 4b[vii])
 - Follow seasonal permanent closure areas (Exhibit B)
- All lumber utilized at the site will be processed in compliance with current laws and regulations regarding wood treatments. This includes lumber utilized in assembly and repair of aquaculture racks (Section 6[i])
- Permittee will make best efforts to remove debris associated with aquaculture production operations including wood from racks, plastic spacers, unused shellfish bags, shellfish shells, and any other associated items (Section 7[b])

Per Section 4(b)², specific measures incorporated into the EIS based on public, agency, and NAS comments during the NEPA process include the following:

- Clearly delineate boat access routes for use under action alternatives
- Delineate seasonal and permanent closure areas with GPS and visual demarcation
- Devise and implement methods for tracking all oyster-related watercraft in the estuary using GPS technology (MMC 2011b)
- Mark aquaculture boats for easy identification (MMC 2011b)
- Removal of European flat oyster as a potential species for cultivation (DBOC 2012b^{lxxxii})
- Prohibition of stake culture methods

² Per section 4(b) of the 2008 Special Use Permit, “Based upon the findings of an independent science review and/or NEPA compliance, Permittee reserves its right to modify the provisions of this Article 4. Permittee further reserves its right to incorporate new mitigation provisions based upon the findings of an independent science review.”

As with the existing authorizations, prior to expiration on November 30, 2022, the new SUP would require DBOC to remove certain buildings and facilities, any structures or improvements added to the property since 1972, and all its personal property (including shellfish and shellfish rack infrastructure) from the onshore and offshore operating areas. This includes the temporary office trailer, punching shed, temporary cannery, temporary storage, setting tanks, main dock, work platform, sediment basin, mobile homes, picnic areas, shell storage, and all other equipment. Any new structures developed under the authority of the new permit would be considered personal property and would be removed prior to the expiration of the permit. DBOC would be required to restore affected areas to “good order and condition” by the end of the permit term, as specified by section 23(a) of the SUP. NPS would oversee this work and work with DBOC to establish an orderly timetable for removal and to ensure that it is completed prior to the expiration of the new SUP.

SPECIAL USE PERMIT AREA AND MARICULTURE SPECIES

Under all action alternatives, the boundaries of the permit area would be adjusted to incorporate all areas within Drakes Estero required for shellfish operations. Boundary adjustments would be made to encompass reasonable boat travel routes between culture beds and include the six racks currently located outside the permit boundaries. Boat operations would not be allowed outside of permit boundaries unless specifically authorized under the SUP. Incorporating the racks and realistic boat travel routes within the permit boundary would assist with compliance of permit terms and enforcement. All ground disturbing activities would require NPS approval due to the potential for archeological resources in the area.

NPS also would revise the permit area boundaries to minimize impacts on Seashore resources. NPS would exclude the harbor seal protection areas and a known archeological site from the new permit boundary. Modification of the permit area to exclude established seal protection areas from the permit boundary reduces the offshore boundary by approximately 4 acres. Removal of the onshore archeological site from the permit area reduces the permit area by approximately 0.3 acres. The harbor seal protection protocol within the SUP (Exhibit B) states: “throughout the year, all of Permittee’s boats, personnel, and any structures and materials owned or used by Permittee shall be prohibited from the harbor seal protection areas” (NPS 2008b). Adjusting the permit area to exclude the harbor seal protection areas is not only consistent with the protocol of the current SUP but also with the 2007 CCC Cease and Desist Consent Order compliance agreed to by DBOC (DBOC 2008a^{lxxxiii}). Additionally, DBOC proposed to further reduce the area of Bed 17 to prevent impacts on harbor seals, as outlined in its proposed boundary adjustment letter to NPS on March 15, 2011 (DBOC 2011e^{lxxxiv}). Establishing a permit boundary that is consistent with the harbor seal protection area would be consistent with the recommendations of the NAS and MMC, which documented the potential for commercial shellfish operation activities to impact harbor seals (NAS 2009; MMC 2011b). Overall, the size of Bed 17 would be reduced, as proposed by DBOC, where it overlaps the existing harbor seal protection area (see figure 2-1). These changes would take place under all action alternatives, and additional detail is provided under each alternative as applicable.

Mariculture Species

The species to be cultivated varies among alternatives; however, in all three action alternatives, DBOC would be permitted to grow Pacific oysters in Area 1. During development of the action alternatives,

European flat oysters had also been included in Area 1 under all action alternatives because it is included in the existing Lease M-438-01 and because it has been included in the list of species DBOC requested to grow (DBOC 2008e^{lxxxv}, 2012a^{lxxxvi}, 2012c^{lxxxvii}). In the time since the Draft EIS was released to the public for review in the fall of 2011, DBOC has requested that European flat oyster be removed from consideration as a species that they may cultivate at some point in the future; therefore, this species is not considered for cultivation in the Final EIS (DBOC 2012b^{lxxxviii}).

Under all alternatives, a production limit would be established, consistent with SUP section 4(b)(i). The production limit would be defined as the average annual production over a rolling three year period, which would include the current year and the two previous years. An example of this rolling average is given under alternative B below. The use of this rolling average is a reasonable accommodation that allows the operator to plan and adjust production based upon results of prior year production and is within the reasonable timeline of production. The production limits proposed would be inclusive of all shellfish species harvested.

These production limits are based on the use of the conversion methods used by CDFG during the drafting of this document. Specifically, the weight of Pacific oysters is calculated assuming 100 oysters per gallon (per California Fish and Game Code Section 15406.7) for shucked product and 8.5 pounds per gallon. Manila clams are calculated as 30 clams per pound. CDFG is in the process of revising conversion factors; however, this EIS is based upon use of the conversion factors described here. For an example of how these conversion rates apply to a specific production limit, please see the alternative B description below.

DBOC OPERATIONS AND FACILITIES

DBOC would use and maintain structures in both offshore and onshore areas to support its operations, with variations among the alternatives. Likewise, equipment currently deployed for these activities would also be in use for all action alternatives. Under all action alternatives, DBOC operations would be subject to all applicable laws and policies. Actions such as replacement of the main dock, work platform, and racks may require permits from agencies other than NPS. DBOC would be responsible for obtaining and complying with all appropriate permits and authorizations. Permits required may include but are not limited to the following:

- Coastal Development Permit from CCC
- San Francisco Bay Regional Water Quality Control Board CWA section 401 Certification
- USACE section 404(b) and/or section 10 permit for potential dredge and fill activities
- Marin County building permits

Offshore Operations and Facilities

Under all action alternatives, DBOC would cultivate approximately 138 acres of Drakes Estero using a combination of rack culture, floating culture, and bottom bag culture methods (4 acres of Bed 17 would be removed, as discussed above). As mentioned earlier, although JOC used stake culture in the past, DBOC has not use this method (DBOC 2012d^{lxxxix}) and has not proposed to use this method; therefore, it is not included as a possible culture method under the action alternatives. Within the 138 acres of culture beds, DBOC

would conduct hanging culture using the 95 existing racks in Drakes Estero and would conduct bag culture in up to 84 acres of Drakes Estero (although, as mentioned above, some of this 84 acres may be left fallow between uses). Changes to the permit boundary would incorporate the six racks currently outside the permit area. Section 6 of the 2008 SUP would continue to require that racks be maintained in a “safe and orderly manner” (section 6[f]) and “all lumber utilized at the site would be processed in compliance with current laws and regulations regarding wood treatments” (section 6[i]), including lumber used in repair of racks in Drakes Estero (NPS 2008b). During permitting for emergency dock replacement at DBOC in the spring of 2011, USACE advised that “any chemically treated wood material must be coated with an impact-resistant, biologically inert substance” as part of its special permit conditions for the Regional Permit Authorization (USACE 2011b). DBOC would be required to consult with the USACE on appropriate treatment methods to coat chemically treated wood. Any proposal for new racks and/or changes in cultivation area would require additional review and compliance under the SUP.

As described in its November 2010 submittal, 50 racks in Drakes Estero are categorized by DBOC as “Needs repair Inactive.” In its June 5, 2012 letter, DBOC proposed to repair/replace 50 racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{xc}). It is assumed that the 50 racks in 2013 are the 50 racks categorized as “Needs repair inactive” in 2010. For the calculations related to repair/replacement as requested by DBOC, it is assumed that some percentage of the lumber is serviceable. In 2013, the 50 racks deemed “Needs repair Inactive” represent a total length of approximately 13,608 feet covering 3.75 acres. Assuming that 50 percent to 75 percent of the materials in the inactive racks need to be replaced, the 2013 repairs would require installation of between 65,000 and 97,000 linear feet of lumber. In addition, it is anticipated that between 1,700 and 2,500 vertical 2-inch by 6-inch posts would be installed into the estero bottom. The length of these vertical posts is likely to vary based on location within Drakes Estero. No information regarding the range of lengths required is currently available.

In 2014, 25 racks would be repaired or replaced. This represents approximately half of the total racks classified as “Good Condition Active” according to the 2010 submittal. It is anticipated that the total length of racks treated in 2014 would be approximately 6,030 feet (1.66 acres). Because the racks are characterized as being in good condition, it is anticipated that between 25 percent and 50 percent of the materials would require replacement. This would result in the installation of between 14,000 and 29,000 linear feet of lumber and 380 to 750 vertical posts.

Following the initial wide-scale repairs (to approximately 75 percent of the racks), regular maintenance is proposed (DBOC 2012b^{xci}). NPS estimates that repair and replacement would be minimal with approximately 1,000 to 2,000 linear feet of lumber installed annually with a limited number of vertical posts replaced as necessary.

DBOC has not indicated whether or not rack repair would result in additional boat use in Drakes Estero. It is assumed that the existing shellfish planting and harvest would occur during the period when racks are under repair, and there would be a short-term increase in boat operations in Drakes Estero to support repair activities. DBOC would be required to make repairs to the racks between July 1 and February 28 to avoid harbor seal pupping season.

In addition to continuing to conduct hanging culture on the racks, DBOC would continue to conduct bottom culture and floating culture, as well. Bags would be used both for the nursery stage of oyster growth (following initial attachment to substrate and growth in the setting tanks on shore) and for the

“grow-out” stage (the stage where young mature oysters reach market size). A common bag type used is a 3-foot by 2-foot rubber mesh bag. Trays are 3 feet by 3 feet. It is assumed that the breakdown of culture type in each bed provided in table 2-2 would still apply.

Bags in areas with strong currents would continue to be anchored to the estero bottom using PVC piping (DBOC has not specified the length of the PVC anchors), cinder blocks, or large (100-pound) concrete anchors (DBOC 2010b^{xcii}, 2012b^{xciii}). Anchored lines may be left in place for subsequent planting in the same area. Bags in areas with little current are left unanchored (DBOC 2010b^{xciv}).

As mentioned above, DBOC also would continue to use various types of floating culture. The bottom bags mentioned above can be used for floating culture where bags are anchored along long lines but float during high tide due to the inclusion of closed-cell Styrofoam in the bags (DBOC 2010b^{xcv}). In other cases, racks that are in poor condition and cannot support strings are used for floating bags (this is expected to happen less frequently following the rack repair described above). Floating bags are sometimes hung between racks. In these cases, the racks serve as anchors. Other floating systems near the racks would be secured by concrete anchors (DBOC 2012b^{xcvi}). DBOC also noted that it plans to use floating racks (where available), floating trays, and lantern nets to raise purple-hinged rock scallops (DBOC 2012c^{xcvii}).

For the purpose of assessing impacts of the alternatives, it is assumed that DBOC would typically operate the motorized boats with the barges as described under existing conditions (in the “Boat Operations” section). Although some variation in these operations may take place due to variation in conditions and demands, DBOC typically operates two or three motor boats and two unmotorized barges approximately 12 trips per day, 8 hours per day combined (DBOC [Lunny], pers. comm., 2011h, 2012b^{xcviii}). Under all action alternatives, some change in travel routes would take place to assure that boats operate within the permitted area. DBOC would develop a vessel transit plan for implementation pending NPS review, which may include mooring areas and access lanes. Development of this plan would be required under the new SUP as one of the same terms and conditions in the existing SUP.

NPS and CDPH have reviewed sampling protocols, intent, and requirements. The current SUP includes language for access to the main channel. Access to that station shall be made at flat wake speed within 1 hour of predicted high tide for the area. Flat wake speed means the minimum required speed to leave a flat wave disturbance close astern a moving vessel yet maintain steerageway, but in no case in excess of 5 statute miles per hour (36 CFR 1.4). With regard to water quality monitoring stations for pathogens, CDPH generally requires that primary sites within the permitted growing areas are sampled once per month, with greater frequency during the winter season.

According to CDPH, no active water quality stations are maintained outside of the existing permit area. Secondary stations are sampled less frequently. It is the responsibility of DBOC as the operator to sample the primary stations, while CDPH maintains the secondary stations (with access provided by DBOC boats). NPS will continue to coordinate with CDPH regarding access to stations 17, 18, and 19, during the established seasonal closure (March 1 - June 30). DBOC and CDPH shall notify the NPS of sampling events 24 hours prior to the event. CDPH shall review results with the NPS annually and any changes to the monitoring program should be proposed to the NPS for review consistent with the SUP.

DBOC operations would be subject to the harbor seal protection protocol, which is part of the current SUP. This protocol prohibits boat travel and general operations, including placement of bags, moorings, and installation of floating racks, within the established harbor seal protection areas (see figure 2-1). Other restrictions contained in the existing protocol, including closure of the lateral channel (also shown on figure 2-1) during the harbor seal pupping season (March 1–June 30) and maintenance of a 100-yard buffer from any hauled-out harbor seal, would continue to be in effect. The lateral channel is identified on figures 2-1 and 2-2.

A one-time dredging event at the main dock is common to all action alternatives. The area under the main dock would be dredged by DBOC. Dredging would take place at the outset of the permit term in an area approximately 30 feet wide by 60 feet long and to a depth of approximately 3 feet. DBOC estimates that the total volume of dredged material would be 100 cubic yards (DBOC 2011d^{xcix}); although straightforward calculations indicate that it would be 200 cubic yards (5,400 cubic feet).

DBOC would be required to remove all personal property at the end of the permit term, including racks, culture bags, and other commercial shellfish operations equipment from Drakes Estero. Shellfish owned by DBOC and remaining at the end of the new SUP term would also need to be removed.

Onshore Operations and Facilities

Under all action alternatives, DBOC would continue to process and pack shellfish in the onshore permit area. However, the scale of DBOC onshore operations would vary by alternative, and the configuration and condition of other onshore facilities would vary by alternative. Under all action alternatives, DBOC would replace the existing dock, work platform, and associated structures subject to NPS final review and approval due to damage from the March 2011 storm event. Rather than replacing these items in kind, DBOC has proposed to construct or install the following:

- A new wooden floating dock (12 feet by 32 feet)
- A new concrete work platform (including sediment basin approximately 55 feet by 24 feet)
- New wooden ramps to connect the dock and work platform
- A new conveyor
- A washing system

These items would be constructed in approximately the same location as the existing structures; however, DBOC proposes some changes in size and materials. An advanced washing system with a collector for sediment is proposed. DBOC proposes to install a concrete work platform with a retention curb and sediment basin to limit debris returning to Drakes Estero during shellfish washing and processing at the work platform (DBOC 2011a^c, 2011b^{ci}). These structures would be considered personal property and subject to removal from the site by DBOC prior to expiration of the SUP.

ALTERNATIVE B: ISSUE NEW SPECIAL USE PERMIT—EXISTING ONSHORE FACILITIES AND INFRASTRUCTURE AND OFFSHORE OPERATIONS WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Under alternative B, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Because this alternative includes the authorization for DBOC to continue operating, NPS would delay the conversion of congressionally designated potential wilderness to congressionally designated wilderness until 2022.

This alternative would allow DBOC to conduct its operations in a manner generally consistent with conditions that existed in 2010. Most processing operations would occur according to current practices and within existing structures. In order to receive the new permit, however, DBOC would be required to bring all existing operations and facilities into compliance with the terms of the SUP. In particular, DBOC would be required to provide a detailed operation and maintenance plan for currently unpermitted activities and remove any DBOC property outside the permit area, such as shell piles and abandoned setting tanks. Such a plan would be a requirement of the SUP. NPS would monitor DBOC activities to ensure compliance with permit terms. Future requests by DBOC for changes to facilities or operations would be reviewed by NPS for consistency with the intent of this alternative, which is to maintain the existing (2010) level of operations and development.

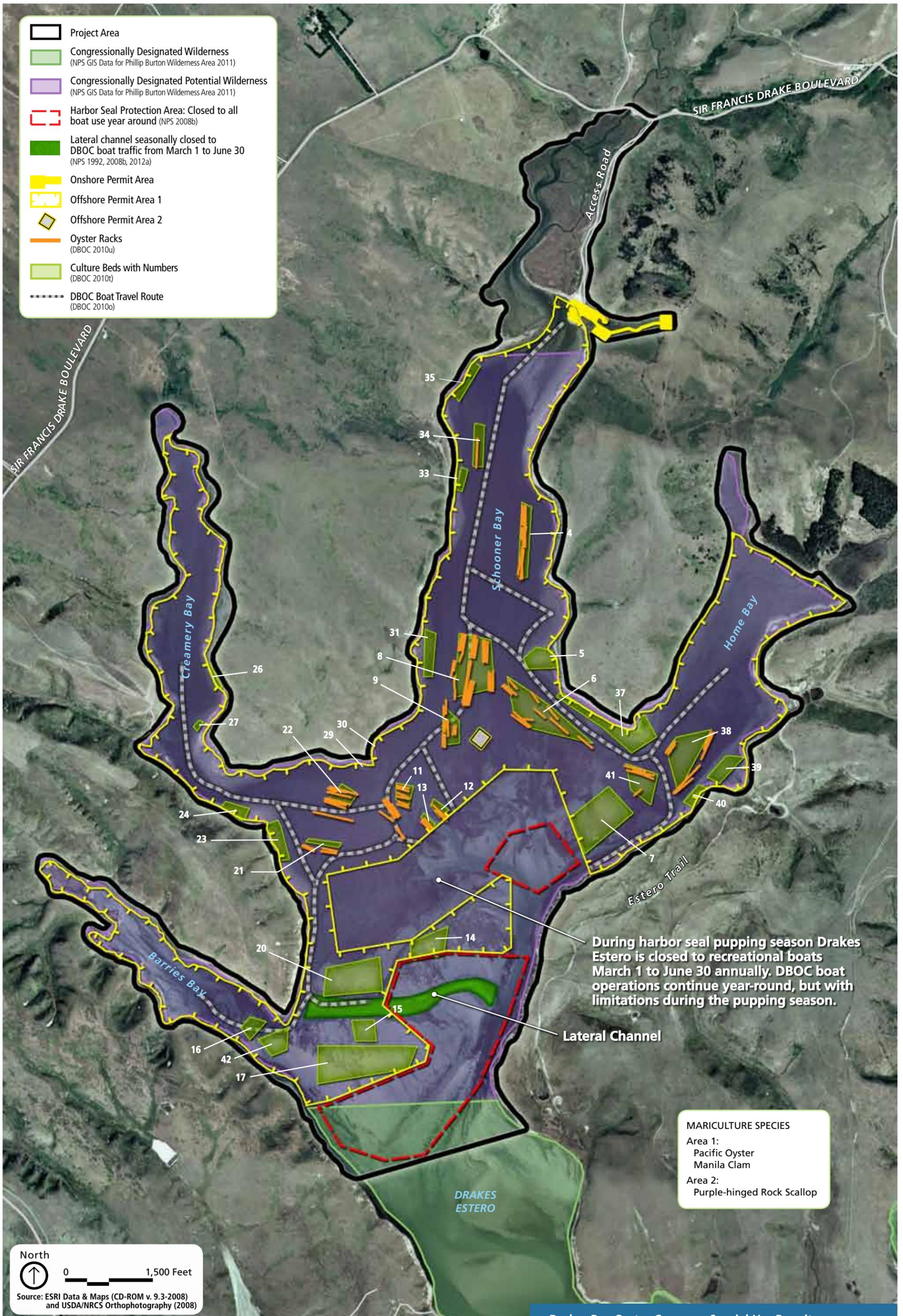
The following addresses further actions and elements of alternative B relating to SUP areas, commercial shellfish species, and DBOC operations and facilities. Refer to the sections “Elements Common to All Alternatives” and “Elements Common to All Action Alternatives” for additional detail.

SPECIAL USE PERMIT AREA AND MARICULTURE SPECIES

Under alternative B, the total acreage of the SUP area, both onshore and offshore, would be approximately 1,083 acres. The permit boundaries would incorporate all areas necessary for boat operations and cultivation, while excluding areas containing sensitive park resources (figures 2-7 and 2-8). The permitted area would incorporate most documented shellfish growing areas within Drakes Estero currently under production. Specifically, the southeast boundary of alternative B would follow the harbor seal protection area boundary. In addition, approximately 74 acres would be added in Schooner Bay to connect the existing parcels for boat travel and incorporate six racks that are not within the existing SUP area. The proposed reductions in growing area bed 17 is consistent with recommendations of the NAS as well as previous DBOC communications in 2008, 2010, and 2011 regarding lease boundary adjustments (described in more detail under the section “Elements Common to All Action Alternatives”).

Mariculture Species

Under alternative B, shellfish species cultivated within Area 1 would consist of Pacific oysters and Manila clams (previously unpermitted in Area 1). Shellfish species cultivated within Area 2 would consist of purple-hinged rock scallops (as currently permitted). The production level limits would be consistent with the production levels existing at the time the EIS was initiated (2010).



During harbor seal pupping season Drakes Estero is closed to recreational boats March 1 to June 30 annually. DBOC boat operations continue year-round, but with limitations during the pupping season.

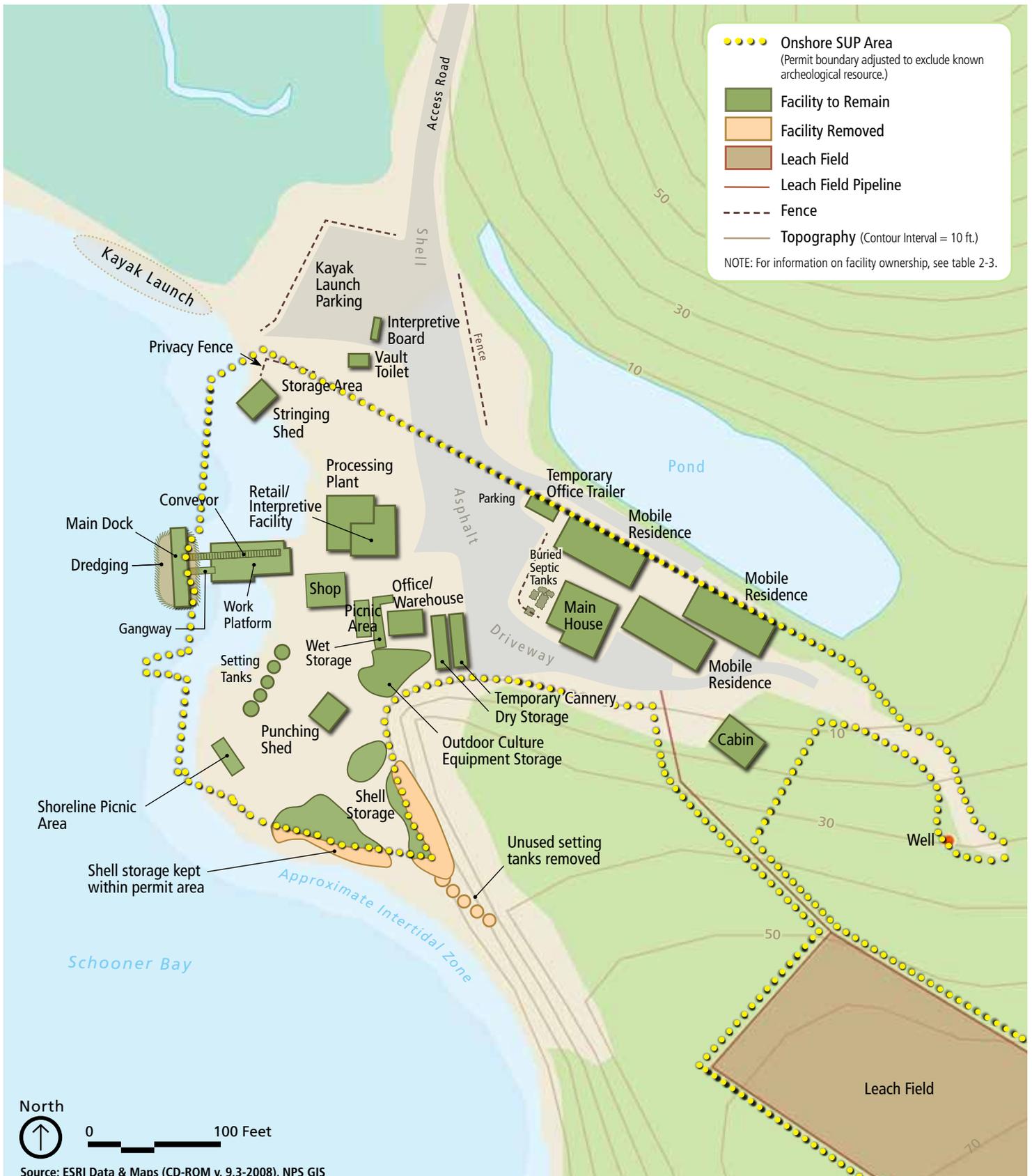
Lateral Channel

MARICULTURE SPECIES
 Area 1:
 Pacific Oyster
 Manila Clam
 Area 2:
 Purple-hinged Rock Scallop

North
 0 1,500 Feet
 Source: ESRI Data & Maps (CD-ROM v. 9.3-2008) and USDA/NRCS Orthophotography (2008)

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FIGURE 2-7
 Alternative B: Issue New Special Use Permit – Existing Onshore Facilities and Infrastructure and Offshore Operations Would be Allowed for a Period of 10 Years (Offshore Operations)



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 2-8
Alternative B: Issue New Special Use Permit – Existing Onshore Facilities and Infrastructure and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations)

In its 2010 proof of use report to CDFG, DBOC reported harvesting a total of 585,277 pounds of oysters and 684 pounds of clams (CDFG 2010a). In 2011, DBOC reported a harvest of 618,375 pounds of oysters and 118 pounds of clams. The NPS SUP would set the production limit for total shellfish produced (all species harvested) annually at 600,000 pounds. This level of production is midway between the 2010 and 2011 DBOC harvests. The SUP would define the production limit using the average annual harvest over a rolling 3-year period, which would include the current year and the two previous years. For example, production of 600,000, 700,000 and 500,000 pounds over years 1 through 3 would be in compliance with this requirement with an average harvest of 600,000 pounds; however, harvest of 600,000, 700,000 and 600,000 pounds each year for a 3-year average of 633,33 pounds would not. The use of an average is meant to allow DBOC to reasonably account for natural variability in growing conditions and to adjust annual production as necessary. The number of individuals that could be produced under this alternative would depend upon the proportion of species harvested in a given year. Assuming 100 percent oyster harvest, a limit of 600,000 pounds would equate to approximately 7,058,854 individuals³. If some other species (e.g., Manila clams) were harvested, the oyster harvest would need to be lowered accordingly to maintain a rolling 3-year average of 600,000 pounds of shellfish produced annually.

DBOC OPERATIONS AND FACILITIES

Offshore Operations and Facilities

Under alternative B, the boundaries of offshore permit Area 1 would be similar to the current SUP offshore boundary (see figure 2-7). Because of the need for DBOC boats to travel between the existing offshore parcels in Schooner Bay, the new SUP would eliminate the gap between these parcels, thereby resolving the concern that DBOC boats currently travel outside the permit area boundary. As with the current SUP, the new SUP would prohibit DBOC from conducting any activities within harbor seal protection areas. These areas would be excluded from the permit area. Area 1 of the offshore permit area would total approximately 1,077 acres. The 1-acre Area 2 (known under existing conditions as Lease M-438-02) would remain as a separate cultivation area for purple-hinged rock scallops.

Onshore Operations and Facilities

Under alternative B, the new SUP would incorporate a total of approximately 4.3 acres of onshore areas. The new permit boundary and list of structures associated with the SUP are shown on figure 2-8. DBOC would be required to keep shell storage within the permit boundary and picnic tables to the picnic area next to the office/warehouse. Although some items were placed without NPS approval (i.e., the cannery, dry storage, outdoor setting tanks, paving, and picnic areas), alternative B includes these structures in their present location. DBOC would be permitted to provide up to 12 picnic tables in the current locations. This would be consistent with the intent of this alternative, which is to maintain existing (2010) conditions.

³ 600,000 pounds of oysters can be converted to individual oysters by multiplying 600,000 pounds by the conversion factor of 100 oysters per gallon and 8.5 pounds per gallon.

ALTERNATIVE C: ISSUE NEW SPECIAL USE PERMIT—ONSHORE FACILITIES AND INFRASTRUCTURE AND MOST OFFSHORE OPERATIONS PRESENT IN 2008 WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Under alternative C, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Because this alternative would authorize DBOC to operate for 10 years, NPS would delay the conversion of congressionally designated potential wilderness to congressionally designated wilderness until 2022.

The intent of this alternative is to allow DBOC to conduct most of the aspects of its operation that were occurring when the existing SUP was issued in April 2008. Onshore facilities would include previously unpermitted or temporary structures integral to ongoing operations. Offshore, Pacific oyster harvest would be authorized in Area 1 and purple-hinged rock scallops would be authorized in Area 2. Manila clams would not be authorized under alternative C. DBOC would be required to remove any DBOC property outside the permit area, including shell piles and abandoned setting tanks. DBOC would also have to remove all picnic tables from the shoreline picnic area. Future requests by DBOC for changes to facilities or operations would be reviewed by NPS for consistency with the intent of this alternative, which is to limit the scale of DBOC operations to those activities approved by NPS as of April 2008. Given the intent of this alternative, it is unlikely that additional or expanded facilities would be approved in the future.

The following addresses further actions and elements of alternative C relating to SUP areas, commercial shellfish species, and DBOC operations and facilities. Refer to the sections “Elements Common to All Alternatives” and “Elements Common to All Action Alternatives” for additional detail.

SPECIAL USE PERMIT AREA AND MARICULTURE SPECIES

Under alternative C, permit boundaries would incorporate areas necessary for boat operations and cultivation, while excluding all other areas (such as those containing sensitive park resources) from access (figures 2-9 and 2-10). The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 901 acres. Approximately 74 acres would be added to the main offshore permit area (Area 1) in Schooner Bay to connect the existing parcels for boat travel and incorporate six racks identified outside of the current SUP. The permitted area would incorporate most documented shellfish growing areas within Drakes Estero currently under production. Specifically, the southeast boundary of alternative C would follow either the harbor seal protection area boundary or the proposed DBOC shellfish growing area boundary, whichever is more protective of the established harbor seal haul-out areas. The proposed reductions in growing area bed 17 is consistent with recommendations of the NAS, as well as previous DBOC communications in 2008, 2010, and 2011 regarding lease boundary adjustments (described in more detail under the section “Elements Common to All Action Alternatives”).

From a water quality standpoint, the majority of Drakes Estero is considered conditionally approved, meaning that it must be monitored to ensure that water quality standards are met. The inner reaches of Creamery Bay, Barries Bay, and Home Bay, however, are unclassified and characterized as prohibited. The 2011 *Management Plan for Commercial Shellfishing in Drakes Estero, California* (CDPH 2012)

presents a map depicting the prohibited areas. Baltan 2006 states that these areas were previously removed from conditional classification because of elevated fecal coliform. CDPH conducts limited monitoring at the secondary stations, but the water quality conditions do not meet the requirements for approval. There are no growing areas within the water quality prohibited area. These areas (approximately 162 acres) would not be included in the offshore permit Area 1.

Mariculture Species

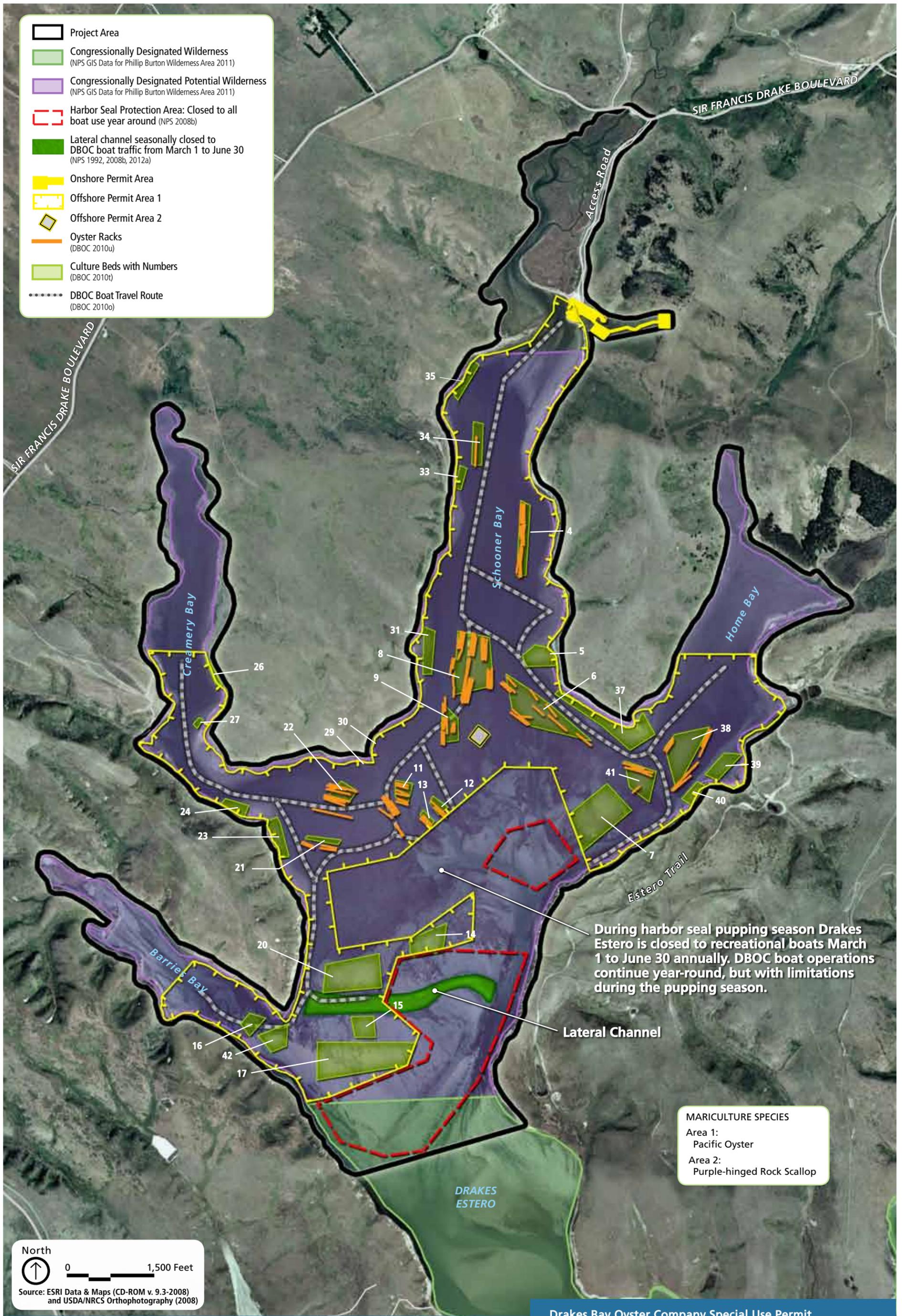
Under alternative C, Pacific oysters would be allowed for culture, production, and harvest in Area 1, as currently permitted by NPS. Similarly, cultivation of purple-hinged rock scallops would be authorized in Area 2. Although Manila clams are presently cultivated in and harvested from Area 1, a SUP granted under this alternative would not allow cultivation and harvest of Manila clams. While Manila clams were authorized for cultivation in Area 2 in 2008, the bottom bag culture method practiced by DBOC was not consistent with authorized cultivation methods. Additionally, in the 2012 NAS review of the Draft EIS, the NAS committee recommended removal of Manila clams as an approach to reduce risk of establishment by this known invasive species along the Pacific coast. Should this alternative be selected, DBOC would be required to remove all Manila clams from Drakes Estero immediately.

Under alternative C, the NPS would set the annual production limit for total shellfish produced in Drakes Estero at 500,000 pounds consistent with 2008 conditions. The production limit is defined as the average annual production over a rolling 3-year period, which would include the current year and the two previous years. The production limit is based on the average production between the years of 2007 and 2009 (see table 2-1). The average production level over this three year period was 454,188 pounds of shellfish, according to tax records submitted by DBOC to CDFG. Alternative C adds approximately 10 percent to this average to acknowledge variability in annual production and would therefore set the averaged annual production limit at 500,000 pounds. This level of production would be similar to the levels on which the 2009 NAS report on commercial shellfish operations within Drakes Estero based potential impacts. This report was based on 2008 and 2009 levels (see table 2-1 for each year's documented production levels).

DBOC OPERATIONS AND FACILITIES

Offshore Operations and Facilities

Under alternative C, two modifications would be made to the boundary of offshore permit Area 1 (figure 2-9). Because of the need for DBOC's boats to travel between the two existing offshore parcels in Schooner Bay, the new SUP would eliminate the gap between the two parcels, thereby resolving the concern that DBOC boats currently travel outside the permit area boundary. Alternative C would additionally remove those areas designated as closed to shellfish harvest ("Prohibited") by CPDH from the permit area. With these adjustments, the offshore permit Area 1 would total approximately 896 acres. The 1-acre Area 2 parcel (formerly Lease M-438-02) would remain as a separate cultivation area for purple-hinged rock scallops. Like the existing SUP, DBOC would be prohibited from conducting any activities within harbor seal protection areas, and these areas would be excluded from the permit area. Additionally, under alternative C, DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and loss of *Didemnum* from oysters. This includes modification of current harvest and distribution practices to



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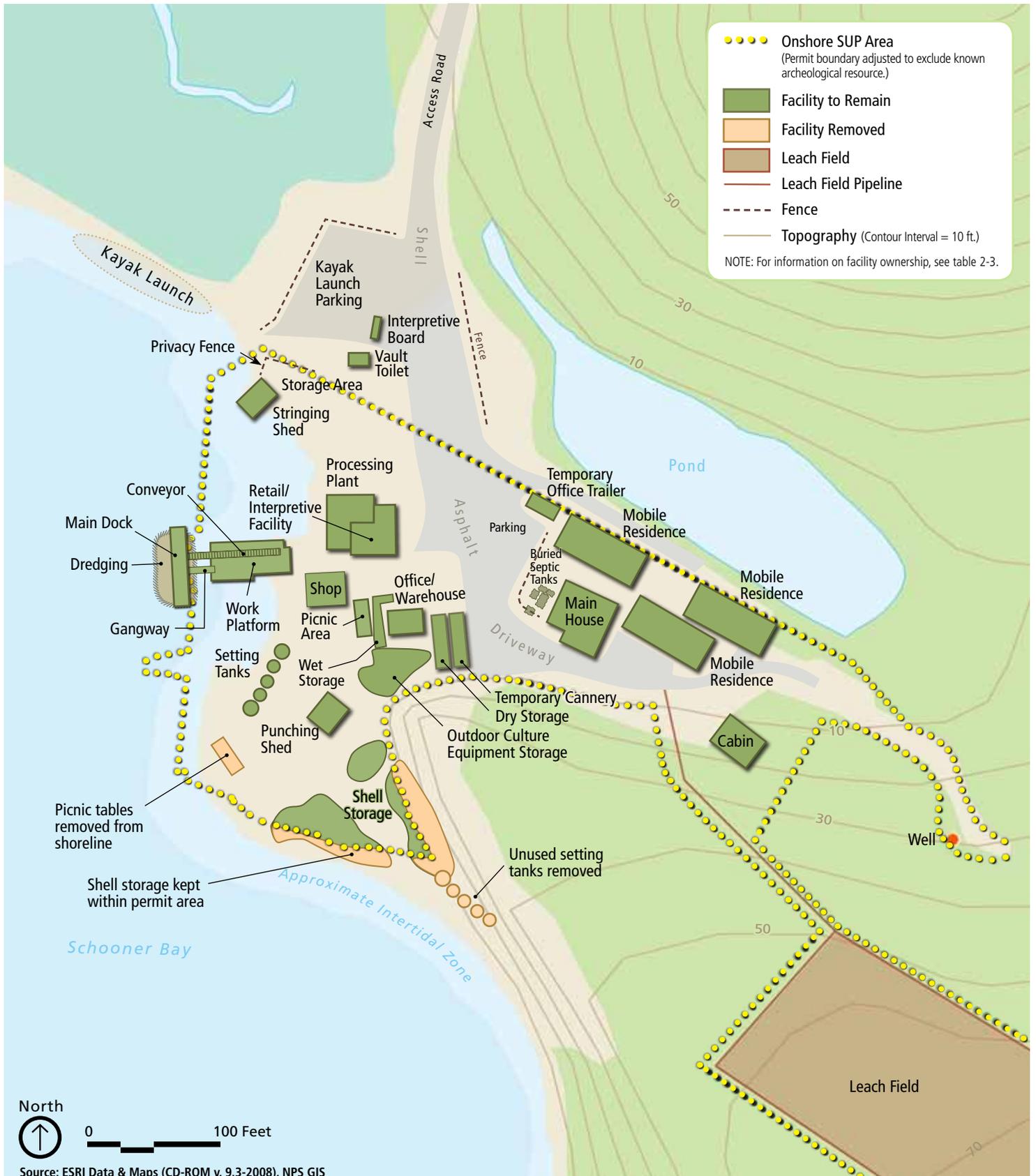
FIGURE 2-9

Alternative C: Issue New Special Use Permit – Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would be Allowed for a Period of 10 Years (Offshore Operations)



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U.S. Department of the Interior

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FIGURE 2-10
Alternative C: Issue New Special Use Permit – Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would be Allowed for a Period of 10 Years (Onshore Operations)



National Park Service
 U.S. Department of the Interior
 Point Reyes National Seashore

ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero. DBOC would be responsible for implementing practices as part of normal operations.

Onshore Operations and Facilities

Under alternative C, the new SUP would encompass an onshore area of approximately 4.3 acres. This would include the well and septic areas and the basic structures required for the commercial shellfish operation. The SUP boundary and list of structures permitted under alternative C are shown on figure 2-10. The cannery, dry storage, outdoor setting tanks, and picnic areas were installed without NPS approval. Under this alternative, the NPS would allow DBOC to retain the cannery, dry storage, and outdoor setting tanks, which are deemed essential to maintenance of a viable operation. Picnic tables would be allowed within the current RUO area in the picnic area adjacent to the office/warehouse. DBOC would remove any shell refuse piles that may be positioned partially outside the permit area and would maintain the shell storage staging area entirely within the permit boundary. Relocation of the setting tanks may also be required because of their proximity to the shoreline and original placement without approval. These alterations would be consistent with the intent of this alternative, to restore the 2008 approved SUP conditions.

ALTERNATIVE D: ISSUE NEW SPECIAL USE PERMIT—EXPANDED ONSHORE DEVELOPMENT AND OFFSHORE OPERATIONS WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS

Under alternative D, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Because this alternative would authorize DBOC to operate for 10 years, NPS would delay the conversion of congressionally designated potential wilderness to congressionally designated wilderness until 2022.

Alternative D presents an expanded oyster operation scenario. Under this alternative, DBOC would expand its operations and add to or modify facilities and infrastructure. DBOC submitted two conceptual drawings to NPS showing possible expansion scenarios. One of these drawings was developed in 1998 by JOC and the other is a more recent proposal prepared by DBOC.

The elements of this alternative were developed using information submitted by DBOC prior to and during the development of this EIS. Alternative D incorporates those elements of DBOC's proposal that are consistent with the purpose and need for action and the project objectives set forth in chapter 1, and that conform to NPS's jurisdiction over DBOC's operation. The following discussion explains the modifications made to DBOC's proposal based on the purpose and need of this EIS and the scope of NPS's jurisdiction over DBOC's operation.

On July 6, 2010, DBOC submitted a request to Secretary Salazar for the issuance of a new SUP upon expiration of the existing permit to allow it to "occupy and utilize the buildings and lands on the shores of Drakes Estero" (Latham & Watkins, LLP 2010). In DBOC's scoping letter, DBOC again clarified that it "is not seeking a permit from NPS to cultivate oysters in Drakes Estero" and that it only seeks a permit for onshore land and facilities subject to the 1972 RUO (DBOC 2010^{n^{ci}}). A permit limited in scope to onshore areas only is inconsistent with NPS's jurisdiction over Drakes Estero and with section 124, which requires a new permit to contain the same terms and conditions as the exiting SUP. Therefore, this alternative modifies DBOC's proposal to include offshore areas in the proposed permit.

DBOC's proposal also requested specific changes in infrastructure and operations. These requests were included in DBOC's comments submitted to NPS during scoping, as part of DBOC's coordination with CCC pursuant to the California Coastal Act and the Consent Cease and Desist Order CCC-07-CD-11 (including application materials for a CDP and in requests made to CDFG regarding changes in species cultivation and lease boundaries). These items are discussed in more detail below, and appropriate citations to the source for each element of the alternative are included. NPS incorporated those project specific elements requested by DBOC that met the parameters discussed above. Alternative D includes all specific facility and operational changes proposed by DBOC (including updates to proposals as the EIS has been drafted).

This EIS analyzes infrastructure proposals at the conceptual level. If this alternative is selected, DBOC would be required to submit, for NPS review and approval, detailed design for onshore development before any construction could be authorized. Additional NEPA compliance would be required and would be the responsibility of DBOC. Future requests beyond the proposals presented here would be evaluated

for consistency with the intent of this alternative, which is expanded development and operations until expiration of the new SUP. It is likely that additional or expanded facilities would be approved under this alternative if reasonable given the 10-year term of the permit. DBOC would be responsible for obtaining all applicable permits and approvals prior to construction. Any new facilities and infrastructure constructed by DBOC would be considered DBOC's private property, which DBOC would be required to remove by November 30, 2022.

The following addresses further actions and elements of alternative D relating to SUP areas, commercial shellfish species, and DBOC operations and facilities. Refer to the sections "Elements Common to All Alternatives" and "Elements Common to All Action Alternatives" for additional detail.

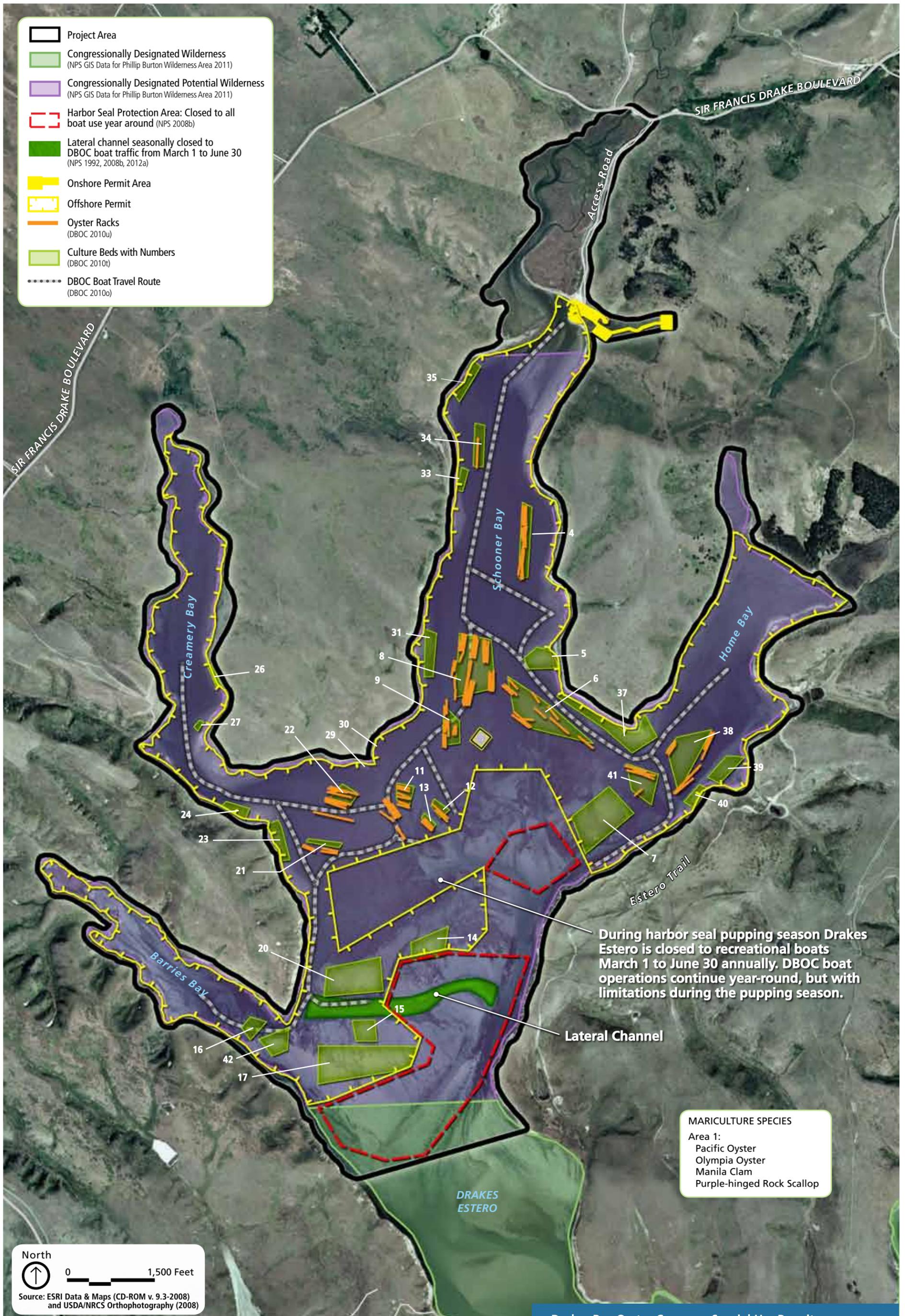
SPECIAL USE PERMIT AREA AND MARICULTURE SPECIES

Under alternative D, permit boundaries would incorporate areas necessary for boat operations and cultivation, while excluding areas containing sensitive park resources, such as archeological sites and harbor seal haul-out areas, from access (figures 2-11, 2-12, and 2-13). The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 1,087 acres, which incorporates the boundary adjustment requested by DBOC. The boundaries for offshore Area 1 of the permit would be generally based on the DBOC proposal to CDFG for lease boundary revisions (DBOC 2011e^{ciii}). Approximately 74 acres would be added to the permit area (Area 1) in Schooner Bay to connect the existing parcels for boat travel and incorporate six racks identified outside of the current SUP. The permitted area would incorporate most documented shellfish growing areas within Drakes Estero currently under production. The southeast boundary of alternative D would follow the harbor seal protection area protocol and the proposed DBOC shellfish growing area boundary. The proposed reductions in growing area bed 17 is consistent with recommendations of the 2009 NAS report, as well as previous DBOC communications in 2008, 2010, and 2011 regarding lease boundary adjustments (described in more detail under the section "Elements Common to All Action Alternatives").

Mariculture Species

Under alternative D, culture, production, and harvest of Pacific oysters, Olympia oysters, purple-hinged rock scallops, and Manila clams would be permitted in Area 1, as requested by DBOC (DBOC 2010g^{civ}, 2011c^{cv}). DBOC currently cultivates Pacific oysters and Manila clams in Area 1, although the latter are being grown without NPS approval. This alternative would result in after-the-fact approval of Manila clam cultivation in Area 1. Because all four species would be grown in Area 1, there would be no need to maintain Area 2 as a separate area under this alternative.

DBOC has also indicated that there would be no changes in production methods associated with this alternative (DBOC 2010g^{cvi}). However, DBOC separately stated that it has been studying purple-hinged rock scallops and recognizes the challenges in producing scallop seed and rearing scallops. Hatchery techniques are less established for scallops than for oysters. Scallops take approximately 4 years to reach market size (approximately 1 pound). DBOC indicated that this is a long-term project that would require significant research, training, and investment (DBOC 2011c^{cvi}). If scallop cultivation requires techniques that differ materially from those described under the elements common to all action alternatives, these new methods would be subject to review by NPS.



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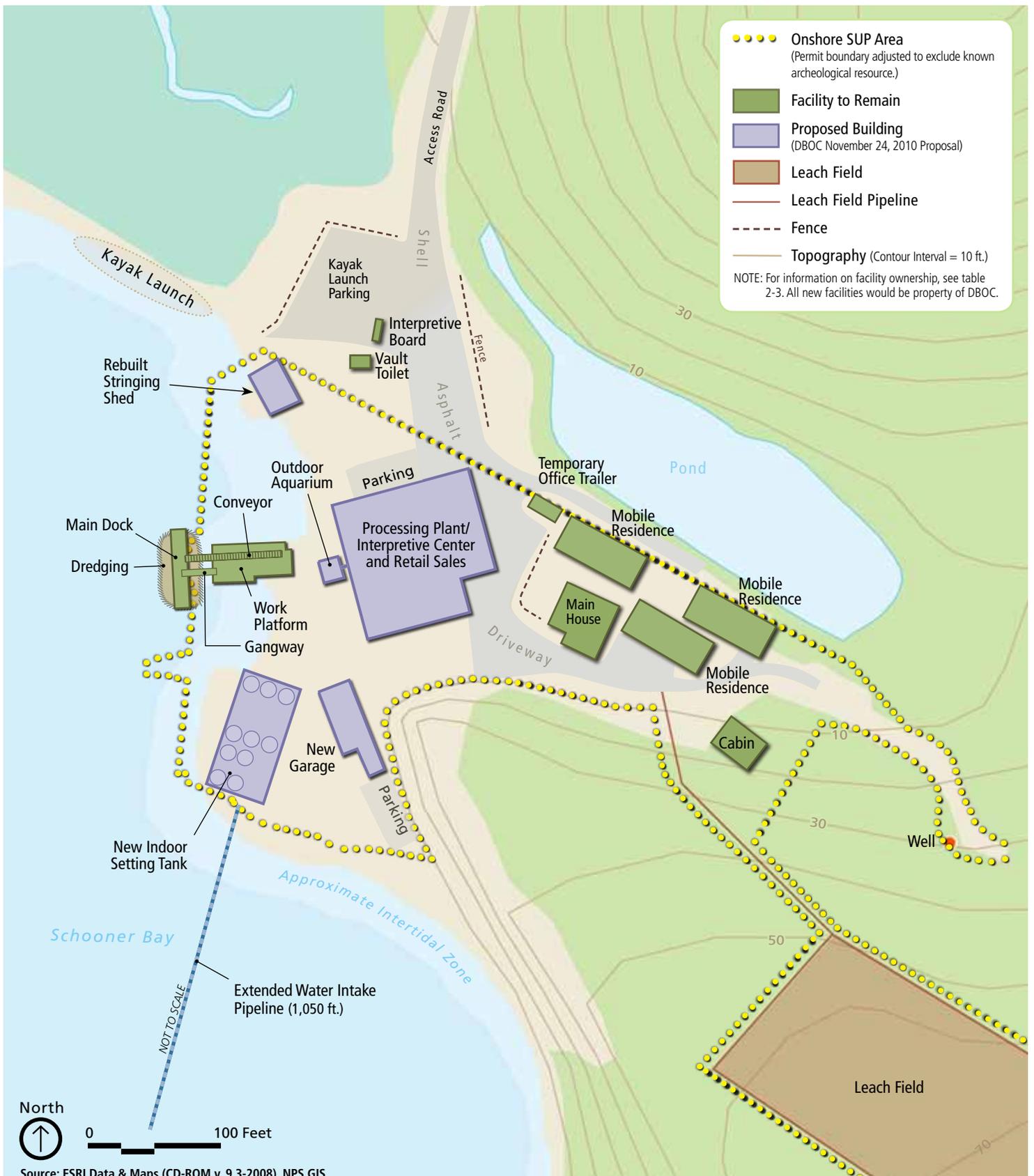
FIGURE 2-11

Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Offshore Operations)



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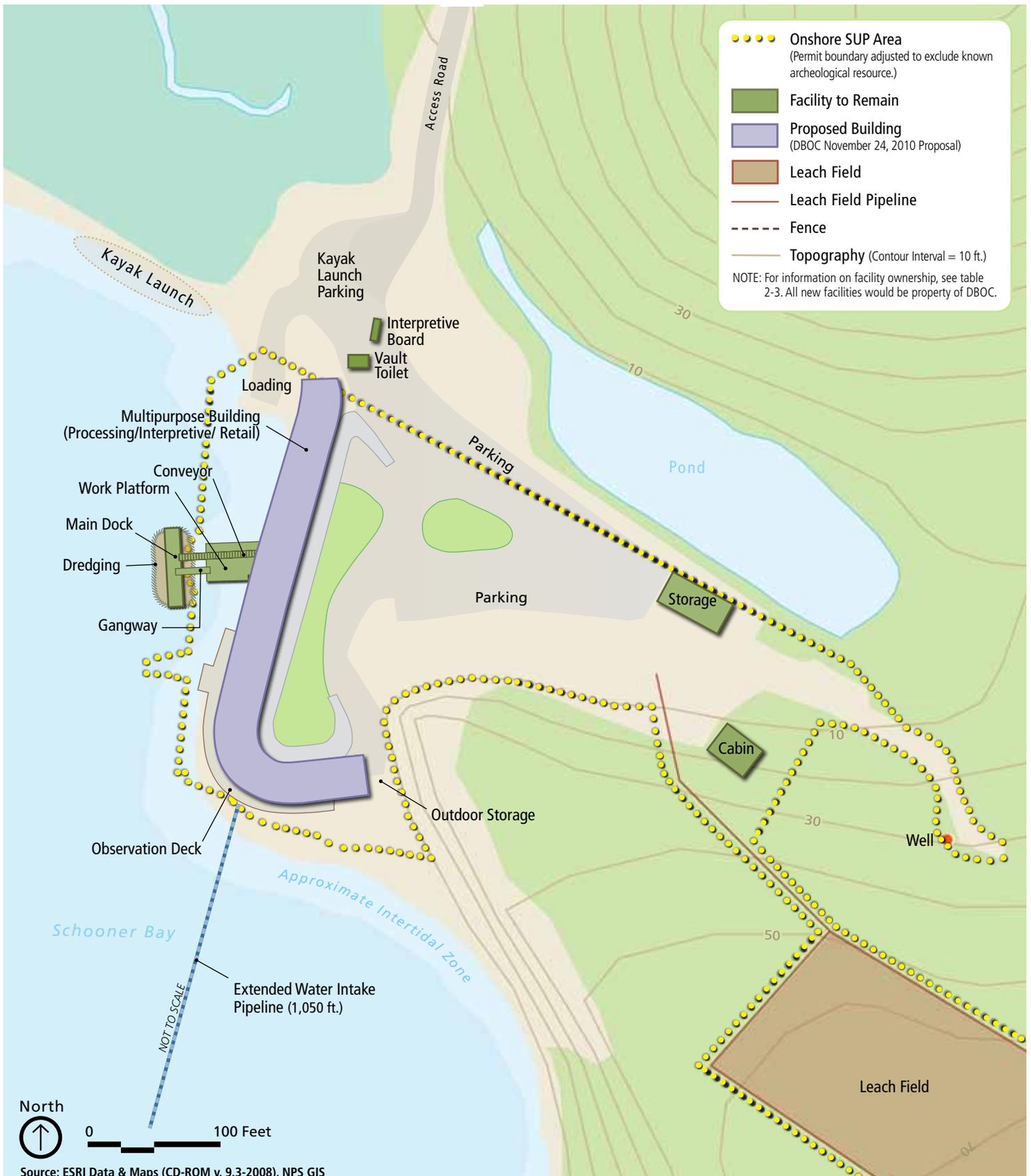


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FIGURE 2-12
Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations – Option 1)



National Park Service
 U.S. Department of the Interior
 Point Reyes National Seashore



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FIGURE 2-13
Alternative D: Issue New Special Use Permit – Expanded Onshore Development and Offshore Operations Would be Allowed for a Period of 10 Years (Onshore Operations – Option 2)

DBOC also has requested permission to collect native Olympia oyster and purple-hinged rock scallop larvae within Drakes Estero for private commercial purposes. The intent is to collect free-swimming larvae to cultivate the same genetic types as are normally found in Drakes Estero and to reduce reliance on outside sources. No detailed information was provided on the proposed collection techniques. Though such collection is considered and analyzed as part of this alternative, it may not ultimately be authorized. NPS regulations (36 CFR 2.1 and 2.3), NPS *Management Policies 2006*, and the MLPA prohibit this sort of collection.

Under alternative D, production levels would be consistent with the production levels requested by DBOC to CCC in 2008. During the initial efforts to address the 2007 CCC Cease and Desist Consent Order regarding production limits, DBOC suggested a production limit of 850,000 pounds. This limit was based on the 2006 and 2007 planting records. According to DBOC, “if all environmental conditions are conducive and mortality rates are low, as much as 850,000 pounds could be harvested in a single year” (DBOC 2008b^{cvi}). Under alternative D, shellfish production would not exceed 850,000 pounds annually (when averaged over the past three years, inclusive of all harvested species). This level of production would be approximately 40 percent greater than the 2010 annual DBOC production and is approximately 85 percent greater than the level of production that occurred between 2007 and 2009.

DBOC OPERATIONS AND FACILITIES

Offshore Operations and Facilities

Under alternative D, the offshore permit boundaries would be based on DBOC’s proposed adjustments to Lease M-438-01 (DBOC 2011e^{cx}), but with some adjustments (see figure 2-11). Because of the need for DBOC’s boats to travel between the two offshore parcels in Schooner Bay, the new SUP would eliminate the gap between the two parcels, thereby resolving the concern that DBOC boats currently travel outside the permit area boundary. This change would add 74 acres to the existing permit area. As with the current SUP, the new SUP would prohibit DBOC from conducting any activities within harbor seal protection areas. These areas would be excluded from the permit area. This would result in the offshore permit area totaling approximately 1,082 acres. Because of the increased production limit, there is the potential for DBOC to increase the acreage of commercial shellfish culture taking place in Drakes Estero at one time (fewer culture beds may lie fallow). If DBOC is able to increase efficiency of operations (for example, a harvest trip with more staff could double the product in the same amount of time), there would be no change in the level of operations. Therefore, an increase in boat use may not be necessary (DBOC 2012b^{cx}); however, due to the uncertainty of future operations, it is assumed that just as no increase in boat traffic is possible, more frequent boat trips may also be possible. Commercial shellfish activities would remain limited to the 138 acres designated on figure 2-11.

Onshore Operations and Facilities

Because the permit applicant has suggested two conceptual designs that are developed to differing degrees, this alternative presents each option at a conceptual level. As described under “Elements Common to All Action Alternatives” any new construction would be considered DBOC’s personal property, which DBOC would have to demolish and remove prior to the expiration of the SUP. DBOC proposals would be subject to revision by NPS to address functionality, safety, economic feasibility (given that the new permit is

limited to a 10-year term), and impacts on park resources and visitor experience. Because both options involve construction of new buildings, the plans would be subject to additional environmental review, including an evaluation of flood zones and alternate locations to avoid fill of wetlands.

During the development of this EIS, DBOC submitted two concepts for expanded onshore development of the site. Option 1 is summarized on figure 2-12 and is based on a development proposal by JOC submitted by DBOC during public scoping (DBOC 2010n^{cxii}), Additional detail was supplied by DBOC's recent applications to CCC for a CDP (DBOC 2010f^{cxiii}, 2012a^{cxiii}). Under this option, the temporary office trailer, the three mobile homes, the main house, the cabin, and the dock would remain in their existing configuration (see table 2-3 for detail on size and ownership). The stringing shed would be rebuilt. A new indoor setting tank (approximately 6,400 square feet) would be built in the approximate location of the existing outdoor setting tanks.

The existing processing plant would be demolished to make way for a new two-story processing and interpretive center (approximately 7,600 square feet). An outdoor aquarium would be attached to this structure. A new garage and employee parking area also would be constructed south of the new processing and interpretive center. The two shipping containers serving as the cannery and dry storage would be removed.

NPS analyzed this development scenario in an EA and FONSI in 1998 (NPS 1998a, 1998b). Only the new septic facilities identified in the project were constructed. As noted above, in 2003 the NPS revoked approval for the construction and replacement of all facilities that had not yet been completed (NPS 2003c^{cxiv}).



Perspective (looking south) of the concept evaluated in 1998 and proposed, in part, by DBOC. (Image courtesy of Dresler, as submitted by JOC.)

Option 2 is summarized on figure 2-13 and is based on a subsequent DBOC proposal to NPS (DBOC 2011g^{cxv}). Under Option 2, almost all existing facilities would be removed. Only three structures would remain in their existing configuration. The dock would be replaced as described under “Elements Common to All Action Alternatives.” The cabin would be retained as the DBOC manager’s residence, and one mobile home would be retained as storage. All other structures would be demolished to make room for a new multipurpose building (approximately 2,625 square feet). This building would serve both processing and interpretive purposes. Initial plans have included an oyster bar; however, section 18 of the RUO specifies that a restaurant would not be allowed on site without prior written approval of the Director of NPS.

Under both options, a new 1,050-foot water intake (composed of two 4-inch high density polyethylene, fusion welded pipes, side by side) would be installed into Drakes Estero to supply water for the oyster processing activities. The pipes would be anchored using two concrete anchors every 100 feet. The anchors would be buried by hand on each side of the pipelines (DBOC 2012b^{cxvi}).

As noted by DBOC, the concept drawings do not show any staff housing except a manager’s residence (the cabin). DBOC has stated that it may seek to incorporate additional staff housing during subsequent design development (DBOC 2011g^{cxvii}). The conceptual analysis provided in this EIS applies only to on-site development contained in the design proposal that DBOC has submitted. If DBOC provides revised design concepts that include additional housing, additional NEPA review would be required.

Under both scenarios for expanded development, DBOC would provide expanded facilities for interpretation, cultivation, and processing. Parking also would be improved, although details of this improvement would be refined during the future design stages of development. DBOC requested 12 picnic tables and 12 grills from NPS (DBOC 2012c^{cxviii} and 2012f^{cxix}, respectively). Separately, DBOC requested 18 picnic tables as well as 12 grills in a letter to CCC in February 2012 (DBOC 2012a^{cxx}). Under this alternative, DBOC would be allowed up to 18 picnic tables and 12 grills within the permit area. Visitors would be provided with increased opportunities to experience the stages of shellfish processing in the improved new interpretive facility and retail shop. While the interpretive facilities may increase in size and opportunity to view the commercial shellfish operation, NPS does not expect DBOC to expand the scope of the interpretive services. Expanded services would require an additional SUP. Finally, both conceptual design options include the removal of the shipping containers currently in use as the cannery and dry storage.

As a mitigation measure unique to this alternative, during additional design phases of the new onshore development under alternative D, NPS would work with DBOC to ensure that onshore sound-generating equipment would be housed within new buildings constructed or otherwise enclosed to the extent practicable.



Artist's rendering of the Option 2 facility, looking into Schooner Bay (submitted by DBOC with Option 2 site plan). (Image courtesy of Ecological Design Collaborative, as submitted by DBOC [(DBOC 2011g^{xxi}).])

ALTERNATIVE ELEMENTS CONSIDERED BUT DISMISSED

The CEQ has defined reasonable alternatives as those that meet the project objectives to a large degree, are economically and technically feasible, and meet the purpose of and need for the proposed action. Alternatives that cannot be implemented or that do not resolve the need for action nor fulfill the stated purpose (to a large degree) should be eliminated from further analysis. The Director's Order 12 Handbook further states that options that are unreasonably expensive, that do not meet park mandates, that are inconsistent with park statements of purpose and significance or management objectives, or that have severe environmental consequences may also be unreasonable alternatives to consider, although none of these factors automatically render them so (NPS 2001b). The following alternative elements were considered but dismissed from in-depth analysis.

OPEN SHELLFISH OPERATIONS TO COMPETITIVE BID

During the scoping phase of the project, the NPS received public comments suggesting that commercial shellfish operations within Drakes Estero be opened to competitive bid as is generally done for concession operations. Congress has authorized the NPS to issue, subject to certain considerations and then only pursuant to certain conditions, a SUP for the operations of DBOC within Drakes Estero at the Seashore (PL 111-88 section 124, 123 Stat. 2904 [2009]). As that statutory authorization is limited to only one specific entity, DBOC, the SUP cannot be made subject to competition.

Also, section 124 precludes NPS from requiring DBOC to seek a concession contract, another mechanism designed to foster competition. Public comments correctly note that concession contracts may not be awarded in most circumstances without a competitive selection process. Concession contracts may only be awarded for certain types of commercial operations, which do not include commercial shellfish operations at Drakes Estero. Concession contracts are limited to visitor services; i.e., to public

accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the unit of the national park system in which they are located (16 U.S.C. 5951[b], 5952; 36 CFR 51.3 [definition of “visitor service”]).

The primary focus of DBOC is the commercial operation for sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public’s use and enjoyment of the Seashore. As such, these are not visitor services and consequently are not eligible for a concession contract.

This alternative element was dismissed from further analysis because (1) it is not eligible to be implemented as a concession contract and (2) section 124 specifically identifies DBOC as the recipient of the SUP should one be issued.

RELOCATE DBOC

During public scoping, commenters suggested that NPS could relocate DBOC operations outside the Seashore boundaries or elsewhere within the Seashore. Mandating the relocation of DBOC is not within the authority granted to NPS by Congress in section 124. Section 124 states specifically that the Secretary is authorized to issue a SUP with the same terms and conditions as the existing authorizations (RUO and SUP) and geographically identifies these authorizations as linked to Drakes Estero. Neither section 124 nor any other statutory provision provides NPS with authority to direct a private company like DBOC to relocate its business to any particular area outside the Seashore.

Moreover, lands outside the Seashore are not subject to NPS management authority. NPS also does not have the authority to compel CFGC to issue a state water bottom lease for aquaculture on state-owned submerged lands outside the Seashore. Thus, it is not reasonable or feasible for NPS to evaluate alternatives that would require the identification of management protocols for lands and waters outside the Seashore’s boundaries. The appropriate range of alternatives for this EIS consists of alternatives that relate to the Secretary’s authority under section 124, which is the authority to issue a 10-year permit to DBOC at its current location in Drakes Estero.

This alternative element was dismissed from further analysis because it is beyond the scope of authority under section 124 of PL 111-88 granted to the Secretary.

ALTER SPECIAL USE PERMIT TERM

During the scoping process, it was suggested that a new SUP be issued for a period of more or less than 10 years. Section 124 states that the Secretary is authorized to issue an SUP with the same terms and conditions as the existing authorizations for a period of 10 years from November 30, 2012. Prior to the enactment of section 124, NPS advised DBOC that the 1976 Point Reyes Wilderness Act and its legislative history prohibited the NPS from issuing a permit to DBOC for operations after November 30, 2012 (see discussion in chapter 1 of this document). Section 124 is the only authority that allows NPS to issue a permit to DBOC to operate after November 30, 2012, and it clearly mandates that the permit term be 10 years. Therefore, the term of the new SUP being evaluated is for 10 years; any other length of time was considered but dismissed from in-depth analysis.

This alternative element was dismissed from further analysis because it is not consistent with section 124 of PL 111-88; thus, it does not meet the purpose of and need for action.

ISSUE A RENEWABLE SPECIAL USE PERMIT

A number of comments received during review of the draft EIS express the view that a provision in the existing SUP/RUO allows the NPS to issue a “renewable” SUP to DBOC. The provision most often cited by commenters as allowing for a renewable Special Use Permit is Paragraph 11 of the RUO. The response to Concern Statement 36942 addresses the NPS’s authority under Paragraph 11 of the RUO. The NPS may only issue SUPs for temporary residential occupancy after a RUO expires, and these permits are limited to a term of two years. (See DO 53 Reference Manual, Appendix. 14.) This narrow exception does not allow for a “renewable” SUP for commercial operations like that conducted by DBOC.

The NPS may also not issue a “renewable” Special Use Permit under Section 124. This is because Section 124 expressly limits the Secretary’s discretion to issuing a single permit of one 10-year term. This alternative element was dismissed from further analysis because it does not meet the purpose and need for the project and is inconsistent with the authority granted to the Secretary by section 124 of PL 111-88.

CLOSE DBOC DURING A CONTROLLED STUDY

Another alternative suggested during public scoping was to cease DBOC operations for 10 years to evaluate ecosystem response prior to consideration of a new SUP. As stated in section 124, the Secretary is authorized to issue an SUP for a period of 10 years starting from November 30, 2012. Ceasing operations for 10 years to conduct studies before determining whether to issue an SUP is beyond the time frame outlined in section 124, and as such, is inconsistent with the authority granted to the NPS. This alternative element was dismissed from further analysis because it does not meet the purpose of and need for the project and is inconsistent with the authority granted to the Secretary by section 124 of PL 111-88.

INCORPORATE PHASE OUT REQUIREMENTS IN NEW SUP

During alternatives development, the planning team considered incorporating phase out requirements into the new SUP. This option would include a time frame for shellfish operations to cease at a point earlier than the full 10 years to ensure that decommissioning and removal of the facilities would be complete by November 30, 2022. Such requirements were dismissed for the following reasons: (1) The NPS recognizes the need to consult with DBOC on the most effective way to phase out operations as the termination date of the new SUP approaches; and (2) Phase out plans may also differ among alternatives, and they may differ based on the amounts and/or locations of particular species being cultivated as the permit draws to a close.

Should a new permit be issued to DBOC, the permit would allow the NPS to address phase out issues with DBOC through the annual meeting process and through NPS authority to ensure DBOC’s compliance with all permit terms, including the requirement that DBOC remove certain buildings and facilities and all personal property, such as DBOC-owned shellfish and shellfish infrastructure, from the premises on or before November 30, 2022.

In addition, section 124 authorizes a 10-year permit under the existing terms and conditions. Adding detailed phase out requirements that would require DBOC's operation to wind down years before the 10-year term would not be consistent with section 124. This alternative is being dismissed because it is not feasible for NPS to outline detailed phase out requirements at this time and because the addition of detailed phase out requirements is not consistent with section 124.

COMPREHENSIVE RESTORATION OF THE DEVELOPED ONSHORE AREA

A number of commenters suggested that NPS should evaluate an alternative that would provide for comprehensive restoration of the natural environment following the expiration of DBOC authorizations. Specific suggestions included restoration of natural hydrology through removal of the progressive fill that has been associated with commercial shellfish operations at this site for the last 77 years. This would also include restoration of wetland areas originally at this site. Other suggestions included the removal of nonnative shell debris to enhance and allow interpretation of cultural resources. While site restoration would be consistent with applicable laws, NPS policy, and Seashore management objectives, as well as with the general intent of NPS to restore the area following the termination of nonconforming commercial uses, it is outside the stated purpose of the proposed project, which is to evaluate whether the Secretary should exercise the discretion granted under section 124 to issue a 10-year permit to DBOC. Plans for comprehensive site restoration would be developed in the future as part of a separate NEPA action. This EIS considers restoration of the developed onshore area as a reasonably foreseeable future action instead of an element of the action alternatives. The impacts of natural resource restoration at the developed onshore area are discussed in the cumulative impact sections of this EIS.

This alternative element was dismissed from further analysis because it is beyond the scope of this EIS.

MITIGATION

As discussed in the Elements Common to All Action Alternatives section earlier in the chapter, a number of conditions that serve to reduce the intensity of potential impacts on particular resources were included in the 2008 SUP and would be carried forward into a new 10-year SUP. Additional mitigation measures have also been incorporated related to the boating operations plan, removal of European flat oyster and prohibition of stake culture methods in all action alternatives, cultivation of manila clams under alternative C, and housing onshore sound-generating equipment within any new buildings constructed under alternative D. Under alternative C, DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and loss of *Didemnum* from oysters. This includes modification of current harvest and distribution practices to ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero. DBOC would be responsible for implementing practices as part of normal operations.

Other measures were suggested during the review of the draft EIS, but were not incorporated into the final EIS due to the uncertain nature of their technical, operational or economic feasibility. Examples of these suggestions include: use of electric boat motors or paddleboats, use of desiccation and mild acid dips to limit the spread of noxious species, changing culture techniques, and increasing the buffer distance that mariculture workers would be required to maintain from harbor seals. However, if further investigation

into these potential mitigation measures indicates they are feasible, additional mitigation measures may be included as permit conditions in the future.

In addition, Section 2(b) of the 2008 SUP, establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the Premises.

ADAPTIVE MANAGEMENT

Adaptive management is used to improve managers' understanding of ecological systems to better achieve management objectives and suggest changes in action to improve progress towards desired outcomes. It is a continuing iterative process where a problem is first assessed, potential management actions are designed and implemented, and those actions and resource responses are monitored over time. That data is then evaluated and actions are adjusted if necessary to better achieve desired management outcomes (Williams, Szaro, and Shapiro 2009).

In this situation, these sorts of adjustments would not meet the intended purpose of the action alternatives. Adjusting the operation of the oyster farm based on the results of monitoring would likely eliminate the certainty needed by DBOC to manage its business. Therefore, this EIS does not describe an adaptive approach to managing Drakes Estero should a new 10-year SUP be issued to DBOC. However, additional baseline surveys and monitoring are proposed to further increase understanding of the natural ecological processes within Drakes Estero, as described under "Elements Common to All Action Alternatives".

CONSISTENCY WITH SECTIONS 101(B) AND 102(1) OF THE NATIONAL ENVIRONMENTAL POLICY ACT

The NPS requirements for implementing NEPA include an analysis of how each alternative meets or achieves the purposes of NEPA, as stated in sections 101(b) and 102(1). CEQ regulations (40 CFR 1500.2) state that federal agencies shall, to the fullest extent possible, interpret and administer the policies, regulations, and public laws of the U. S. in accordance with the policies set forth in the act (sections 101[b] and 102[1]). This section describes how each of the alternatives under consideration in this EIS meets or achieves these policies.

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

All of the alternatives under consideration in this EIS are consistent with this policy, although to varying degrees. The Seashore was established to preserve the diminishing seashore of the U.S. that remains undeveloped. Within the project area, the waters of Drakes Estero are designated by Congress as potential wilderness, while the onshore areas of the commercial shellfish operation are designated as a special use zone. Alternative A would allow the NPS to fulfill its responsibilities to restore natural processes starting in 2012, upon expiration of the current permit. At that time, some existing structures would be removed and uses would be limited to those that are consistent with activities permitted in wilderness. In addition, the existing congressionally designated potential wilderness in Drakes Estero

would be converted to congressionally designated wilderness in 2012. Alternatives B, C, and D would delay the restoration of the area and conversion to wilderness for 10 years. The additional 10 years of commercial shellfish operations within Drakes Estero would continue to have impacts to Seashore resources such as the risk for establishment (i.e., naturalization) and spread of nonnative species, such as *Didemnum*.

2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.

All of the alternatives under consideration in this EIS are consistent with this policy, although to varying degrees. Under all alternatives, NPS would continue to meet its obligation to ensure safe, healthful, and productive surroundings for Seashore visitors and staff. Alternative A could enhance the esthetics of the area by removing existing offshore structures and converting the area to congressionally designated wilderness in 2012. Visitors to the Seashore who wish to enjoy solitude and an unconfined, primitive form of recreation may view this alternative as more esthetically and culturally pleasing. For those visitors who wish to view an active commercial shellfish operation and enjoy the opportunity to consume fresh oysters within the Seashore, Alternative A would not be as esthetically or culturally pleasing.

Under alternatives B, C, and D, restoration of the area to natural conditions and conversion to congressionally designated wilderness would be delayed by 10 years. During this 10 year period, the area would continue to be characterized by the presence of commercial shellfish equipment, racks, bags, and mariculture-related noises such as motorboat engines and pneumatic drills. The natural setting may also be altered due to the risks associated with invasive species and shellfish-borne diseases.

In terms of productivity, alternatives B, C and D would allow for the continued production of shellfish for 10 years, which could be considered a productive use of Drakes Estero. These alternatives would result in contributions to California's overall shellfish production. Under alternative A, all commercial oyster production would cease, although some other productive uses of Drakes Estero, such as kayaking and recreational clamming would continue. Restoration of natural processes and conversion of the congressionally designated potential wilderness to congressionally designated wilderness in 2012 would also be considered a productive use under alternative A.

3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

Alternative A would provide a wilderness experience to those visitors seeking solitude and an unconfined, primitive form of recreation within the congressionally designed wilderness in Drakes Estero starting in 2012. Alternative A would provide this beneficial use of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

Alternatives B, C, and D would also offer beneficial uses to those visitors who wish to visit an active commercial shellfish operation at the Seashore. These alternatives would also result in the

continued production of local shellfish, which would be considered a beneficial use. Alternatives B, C, and D could, however, result in undesirable and unintended consequences, such as providing a hard substrate that allows invasive species establishment and presence of refuse in Drakes Estero.

4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

None of the alternatives are expected to result in impacts on cultural or historic resources. No impacts to known archeological resources are anticipated and potential impacts to as yet undiscovered subsurface archeological resources would be avoided, minimized, or mitigated. Any ground-disturbing activities within the onshore areas of the SUP would take place in coordination with the California SHPO and the Federated Indians of Graton Rancheria, and would require a site monitor.

A study and assessment of potential historical significance (a DOE) was conducted for the structures currently used by DBOC, both in Drakes Estero and onshore. Due to the level of alteration these structures have undergone over time, the assessment concluded that none maintain historic integrity and are therefore not eligible for listing on the National Register. The SHPO has reviewed the DOE and concurs that the structures are not eligible for listing on the National Register (see appendix D). Therefore, none of the alternatives would have adverse effects on historic structures.

All alternatives would support diversity and variety of individual choice but to varying degrees. Alternative A would allow those visitors seeking solitude and an unconfined, primitive form of recreation an opportunity to enjoy a marine wilderness. However, because all commercial shellfish operations would cease, alternative A would not provide as much diversity and individual choice for those visitors wishing to visit an active commercial shellfish operation and consume fresh oysters within the Seashore. Similarly, while alternatives B, C, and D would provide the opportunity for those choosing to view a commercial shellfish operation and enjoy fresh oysters, these alternatives would diminish the opportunity for those seeking solitude and an unconfined, primitive form of recreation.

5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

All alternatives considered in this EIS would be consistent with this policy but to varying degrees. The Seashore is highly valued for its natural setting, especially due to its proximity to the highly developed and densely populated San Francisco Bay Area. The enabling legislation established the Seashore "to save and preserve, for purposes of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped" (PL 87-657). Public open spaces are an important amenity and highly valued within the local area and the Bay Area. Alternative A would improve the natural setting and open space of the Seashore by removing commercial shellfish operations within Drakes Estero and converting congressionally designated potential wilderness to congressionally designated wilderness.

Economic contributions to the local economy attributed to the more than two million visitors to the Seashore annually would likely continue under all alternatives. Alternatives B, C, and D would also provide an increased economic contribution to the local and state economy by providing jobs and food production, therefore contributing to the standard of living and sharing of amenities in the area.

6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative A would best enhance the quality of renewable resources and maximum attainable recycling of depletable resources. Natural resources associated with the natural conditions and processes in Drakes Estero would be further protected by the conversion of congressionally designated potential wilderness to congressionally designated wilderness. Alternative A would reduce on-site energy consumption from existing conditions, as commercial shellfish operations that use energy, such as motor boats, pneumatic drills, shellfish processing, and residential facilities, would cease. Alternatives B, C, and D would result in increased on-site energy consumption compared to alternative A due to the continuation or increase in commercial shellfish operations. Alternative D would potentially result in the highest contribution to energy use due to increased oyster production and proposed new facilities. In addition, the shellfish cultivated by DBOC under alternatives B, C, and D are not a natural resource within Drakes Estero. Seed for nonnative Pacific oysters and Manila clams (only permitted under alternatives B and D) are imported from outside California. The use of outside resources does not result in enhancement of renewable resources or maximum recycling of depletable resources.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. Guidance from CEQ states that the environmentally preferable alternative is “the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ 1981).

Alternative A is identified as the environmentally preferable alternative because it has the most potential to protect the biological, physical, and cultural environment in and around Drakes Estero. This is based on the following considerations:

- Subsequent to expiration of the SUP, the congressionally designated potential wilderness would be converted to congressionally designated wilderness, as directed by Congress and NPS policies, providing a marine wilderness experience to the public.
- Eelgrass beds in Drakes Estero would benefit from removal of shading by oyster racks and damage by motorboat propellers. These special aquatic ecosystems, functioning as native habitat, nursery grounds, and food for numerous species of fish, waterfowl, and other marine species, would not be disrupted on a daily basis under alternative A.

- Control of the invasive tunicate *Didemnum* would be more manageable under alternative A. Already present within Drakes Estero, this invasive species most often attaches to hard substrates, including hanging culture and racks. Alternative A would remove more than 7 acres of artificial hard (preferred substrate) structures currently used as habitat by the *Didemnum* thereby making management more feasible. Alternatives B, C, and D would allow the oyster substrate to persist or increase for another 10 years, enabling continued expansion of this invasive species.
- Removal of cultivated nonnative species under alternative A would best protect the natural ecosystem of Drakes Estero. Alternatives B, C, and D would allow cultivation of nonnative species to take place in Drakes Estero for another 10 years, which would provide additional time during which these species may become naturalized in this ecosystem. Manila clams, which would be permitted under alternatives B and D, are now documented outside of culture bags, and their age structure indicates recent naturalization (Grosholz 2011b). Ongoing cultivation of Manila clams for a period of 10 years would likely result in expansion of this nonnative species.
- Alternative A would eliminate the daily use and operation of motorboats on Drakes Estero, thereby reducing the potential for disturbance to the resident and migratory wildlife species that depend on its resources.
- Wetland functions and values would be restored through natural processes under alternative A. Fringe wetland habitat and eelgrass beds are susceptible to impacts from continued wave action (such as that caused by boat wakes) and placement of fill material. Alternative A would eliminate from Drakes Estero the daily motorboat traffic and the oyster growing bags, allowing these natural habitats to reestablish. Placement of culture bags and the use of motorboats by DBOC would persist or increase for another 10 years under alternatives B, C, and D.

Atmospheric and underwater noise associated with boat motors, oyster tumblers, pneumatic drills, and daily customer traffic would be removed under alternative A, thus restoring a more natural soundscape within Drakes Estero. These noise generators and associated disturbance would persist and in some cases perhaps increase for another 10 years under alternatives B, C, and D.

SUMMARY OF THE ALTERNATIVES

Table 2-5 provides a summary of the alternatives presented above.

TABLE 2-5. SUMMARY OF ALTERNATIVES

	Alternative A: No New Special Use Permit—Conversion to Wilderness (No-action)	Alternative B: Issue New Special Use Permit—Existing Onshore Facilities and Infrastructure and Offshore Operations Would Be Allowed for a Period of 10 Years	Alternative C: Issue New Special Use Permit—Onshore Facilities and Infrastructure and Most Offshore Operations Present in 2008 Would Be Allowed for a Period of 10 Years	Alternative D: Issue New Special Use Permit—Expanded Onshore Development and Offshore Operations Would Be Allowed for a Period of 10 Years
New SUP	Existing authorizations expire on November 30, 2012. No new SUP for DBOC operations would be issued.	A new SUP for DBOC operations would be issued, expiring on November 30, 2022.	Same as alternative B.	Same as alternative B.
Mariculture Species	N/A	Area 1 (1,077 acres): <ul style="list-style-type: none"> ▪ Pacific oysters ▪ Manila clams* Area 2 (1.0 acre): <ul style="list-style-type: none"> ▪ Purple-hinged rock scallops 	Area 1 (896 acres): <ul style="list-style-type: none"> ▪ Pacific oysters Area 2 (1.0 acre): <ul style="list-style-type: none"> ▪ Purple-hinged rock scallops 	Area 1 (1,082 acres): <ul style="list-style-type: none"> ▪ Pacific oysters ▪ Olympia oysters ▪ Manila clams ▪ Purple-hinged rock scallops Area 2 would be removed.
Acquisition of Larvae and Seed	N/A	Imported.	Imported.	Pacific oysters and Manila clams imported. Olympia oysters and purple-hinged rock scallops collected on site.
Culture Methods	N/A	<ul style="list-style-type: none"> ▪ Japanese hanging culture ▪ French tube culture ▪ Bottom bags ▪ Floating bags ▪ Floating trays 	Same as alternative B.	Same as alternative B.
Production Limits [†]	N/A	600,000 pounds	500,000 pounds	850,000 pounds

* Items have not previously been permitted by NPS

[†] Production limits are expressed as a rolling three year average over the current year and the two previous years and are inclusive of all shellfish species. These production limits were developed assuming 100 individual oysters per gallon and 8.5 pounds per gallon.

N/A = not applicable

TABLE 2-5. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
Offshore Permit Boundaries	N/A	<p>Offshore SUP boundaries would be based on existing leases, with two adjustments to Area 1: (1) The two parcels would be joined in Schooner Bay to allow boats to use the main channel and (2) areas within harbor seal protection areas would be excluded.</p> <p>Area 2 would be maintained for cultivation of purple-hinged rock scallops.</p> <p>Offshore permit area would include 1,078 acres.</p>	<p>Area 1 would be the same as alternative B except the southeast boundary of alternative C would follow either the harbor seal protection area boundary or the proposed DBOC shellfish growing area boundary, whichever is more protective of established harbor seal haul-out areas.</p> <p>Area 2 would be maintained for cultivation of purple-hinged rock scallops.</p> <p>Offshore permit area would include 897 acres.</p>	<p>Offshore SUP boundaries would be based on DBOC's proposed adjustment of the shellfish growing area boundary, with the same two adjustments noted under alternative B.</p> <p>Area 2 would not be maintained as a separate growing area.</p> <p>Offshore permit area would include 1,082 acres.</p>
Offshore Infrastructure	All aquaculture materials, including racks, bags, and other materials would be removed from Drakes Estero as part of closeout activities. Approximately 179,000 linear feet of pressure treated lumber would be removed in addition to removal of remaining culture material.	Regular maintenance of racks, following initial repairs as proposed by DBOC (repair/replace 50 racks in 2013 and another 25 racks in 2014).	Same as Alternative B	Same as Alternative B
Vessel Transit Plan	N/A	A vessel transit plan for DBOC boat use within Drakes Estero would be developed and submitted to the NPS for approval.	Same as alternative B.	Same as alternative B.

N/A = not applicable

TABLE 2-5. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
DBOC Boat Operations	Use of motorized boats in Drakes Estero would cease.	Three motorboats and two nonmotorized barges would be operated in Drakes Estero, approximately 12 trips per day, 8 hours a day, combined.	Same as alternative B.	Same as alternative B, except boat operations may increase due to increased production limits.
Harbor Seal Protection Protocol	N/A	The existing protocol would be included in the new SUP, including seasonal closure of lateral channel and maintenance of a 100-yard buffer from any hauled-out harbor seal at any location and time by DBOC boats and staff.	Same as alternative B.	Same as alternative B.
Onshore Permit Boundaries	N/A	Onshore SUP boundaries would be based on existing NPS authorizations, excluding a known archeological resource. Onshore permit area would total 4.3 acres, including the areas used for water and septic utilities.	Same as alternative B.	Same as alternative B.
DBOC Onshore Facilities: Staff Housing	The main house and cabin would remain as NPS property following SUP expiration. DBOC would be responsible for removing mobile homes following expiration of the SUP.	On-site housing would be provided for DBOC staff in 2 permanent houses and 3 mobile homes, providing a total of 14 bedrooms.	Same as alternative B.	The level of staff housing that would be provided under this alternative has not been determined.
DBOC Onshore Facilities: Picnic Areas	Picnic tables and associated materials are considered personal property and would be removed by DBOC upon expiration of the SUP.	A dozen picnic benches would be provided for DBOC visitors in existing areas.*	Picnic area would be provided at DBOC next to the office/warehouse.	A picnic area with 18 tables and 12 grills may be provided within the SUP area.

* Items have not previously been permitted by NPS

N/A = not applicable

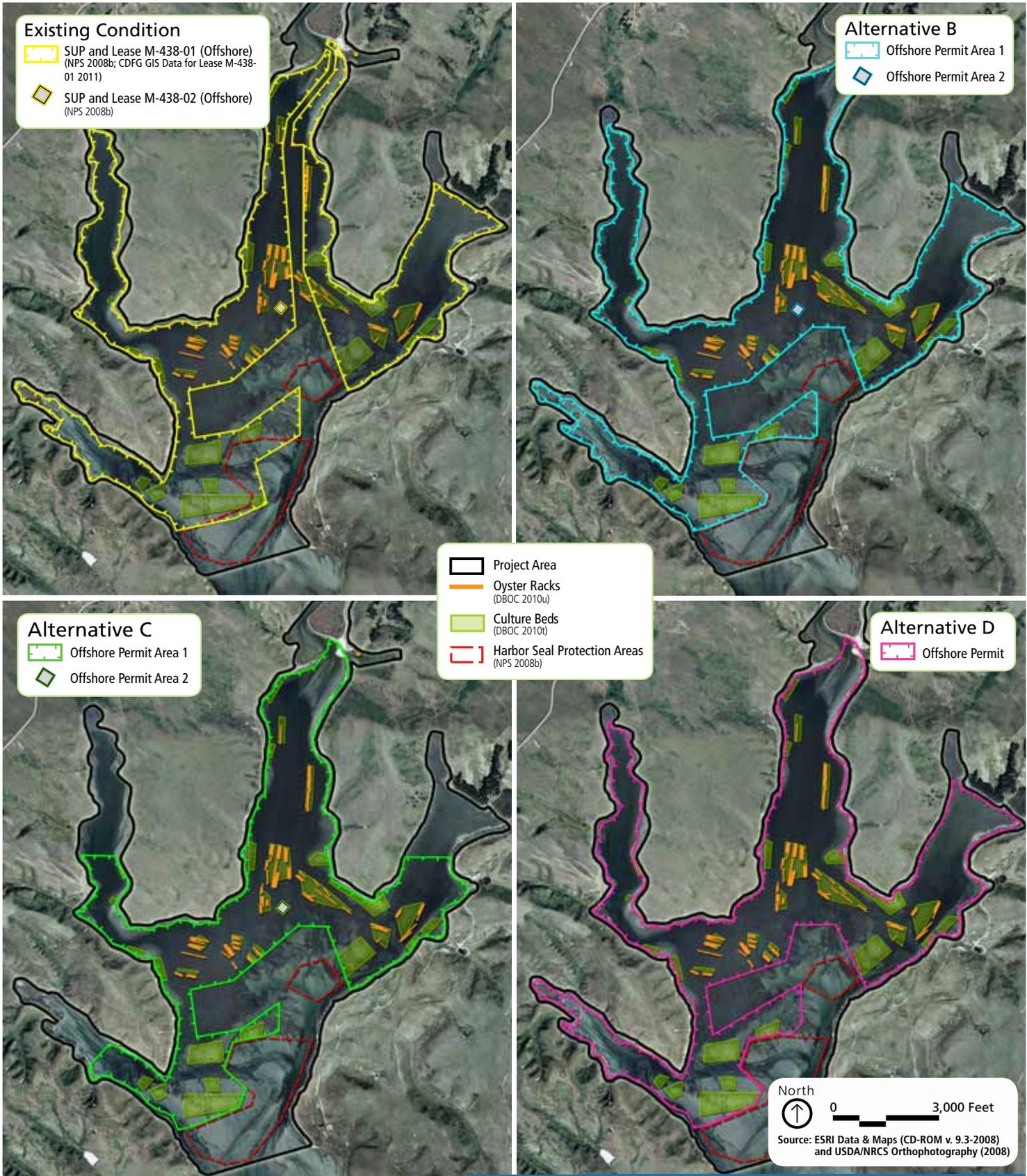
TABLE 2-5. SUMMARY OF ALTERNATIVES (CONTINUED)

	Alternative A	Alternative B	Alternative C	Alternative D
DBOC Onshore Facilities: Processing Plant	DBOC would remove private property within the building. This building is NPS property and would remain on site.	The existing single-story processing plant would continue to house shellfish processing, retail, and interpretive facilities at the existing scale.	Same as alternative B.	The existing processing plant would be removed and replaced in some form by a larger building.
DBOC Onshore Facilities: Cannery	This temporary structure was placed by DBOC and would be removed following SUP expiration.	The cannery would continue to be housed in the existing shipping container.*	Same as alternative B.	The temporary cannery container would be removed and this function served within the new larger processing plant.
DBOC Onshore Facilities: Seeding Tanks	These structures are considered personal property. DBOC would be responsible for removal following the expiration of the SUP.	Seeding would take place in the existing tanks (indoor and outdoor*).	Same as alternative B.	A new seeding plant may be constructed to replace the existing facilities.
Wilderness Status	Following removal of nonconforming uses in Drakes Estero, the congressionally designated potential wilderness would be converted to congressionally designated wilderness in 2012.	A new SUP would be issued for DBOC operations until November 30, 2022. This would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness for 10 years.	Same as alternative B.	Same as alternative B.
Other NPS Operations and Facilities	The existing access road, parking lot, interpretive board, and vault toilet would be maintained. The NPS also would install a gate to limit recreational access to Drakes Estero during harbor seal pupping season.	Same as alternative A, without the addition of the gate.	Same as alternative A, without the addition of the gate.	Same as alternative A, without the addition of the gate.

* Items have not previously been permitted by NPS

COMPARISON OF SPECIAL USE PERMIT BOUNDARIES

Figure 2-14 shows side-by-side comparisons of the overall SUP boundaries as they currently exist and as they would exist under each action alternative. The SUP boundaries are shown at the scale of Drakes Estero because it is the offshore boundaries that change between alternatives. The onshore boundaries remain the same for each action alternative. Under alternative A, no SUP would be issued; therefore, there are no SUP boundaries to display for alternative A.



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

FIGURE 2-14
Comparison of Offshore Permit Areas

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-6 provides a summary of the environmental consequences related to each alternative. A more detailed explanation of the impacts is presented in “Chapter 4: Environmental Consequences.”

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Wetlands and Other Waters of the U.S.			
<p>Overall, alternative A would result in long-term beneficial impacts on wetlands and other waters of the U.S., in the project area. Structures, processes, and functions of the wetlands and other waters of the U.S. would not be permanently affected as a result of actions from alternative A. However, climate change over the long term may result in sea level rise and the year-round inundation of current intertidal marsh. Vegetated wetlands in Drakes Estero occupy available habitat in the upper bays, and while tidal vegetation has the ability to shift with sea level rise, there is little room for vegetation to shift landward along much of the Drakes Estero shoreline due to the steep sideslopes of the surrounding terrain. The removal of personal property would increase the potential that approximately 3.8 acres of the project area could be converted back to historical wetland habitat at the onshore facilities. The removal of approximately 7 acres of racks and up to 88 acres of bags from nonvegetated sandbars and mudflats in Drakes Estero would allow benthic organisms and eelgrass in Drakes Estero to recolonize the space previously occupied by the commercial shellfish operation infrastructure (see "Impacts on Eelgrass" and "Impacts on Wildlife and Wildlife Habitat: Benthic Fauna" sections). Additionally, erosive forces on sediments caused by tidal water flowing across and around bags would be eliminated, restoring natural hydrodynamics in up to 88 acres of sandbars and mudflats currently available for use by DBOC. The reduction of propeller-caused turbidity in the water column also would result in increased sunlight penetration and therefore increased primary production. The removal of racks, including approximately 4,700 posts (2-inch by 6-inch boards), and the removal of bags from up to</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative B would be short-term, minor, and adverse and long-term, moderate, and adverse. In the 138 acres of documented culture beds, bottom bags with anchors and floating lines on up to 84 acres of tidal mudflats/sandbars and 5 miles (7 acres) of racks with floating bags/trays and anchors in subaquatic habitats would continue to occupy estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Impacts associated with these offshore structures would include intermittent disturbances to mudflats and sandbars from the placement and rotation of bags/trays, lines and anchors, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. The impacts associated with these actions would be slightly greater than alternative C but less than those described under alternative D. Onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, or functions of the wetlands and other waters of the U.S. for an additional 10 years. Temporary impacts would be associated with dredging under the new dock. Dredging would occur in a 30-by 60-foot area at the dock. Approximately 1,700 to 2,500 2-inch by 6-inch posts would be installed outside harbor seal pupping season during 2013, and approximately 380 to 750 posts would be</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative C would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars and 7 acres of subaquatic habitat for the racks would continue to disturb estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Racks would be replaced on a schedule of 50 racks in year 2013 and 25 racks in year 2014. The replacements would occur over a few months in each year. Floating culture would likely continue, either attached to racks or using concrete anchors adjacent to racks, but at a reduced level compared to existing operations. Therefore, impacts to wetlands and other waters of the U.S. would be slightly reduced compared to alternative B. Of the 138 acres available for use, bottom bags have been placed on a rotational basis in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Other than the physical presence of structures in wetlands and other waters of the U.S., additional impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. As under alternative B, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands</p>	<p>During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative D would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars would continue under alternative D. Of the 138 acres available for use, bottom bags have been placed in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Racks would be replaced or repaired, and the use of floating culture would continue adjacent to racks resulting in the use of concrete anchors. In addition to the physical objects placed in wetlands and other waters of the U.S., other impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the mud bottom. Because of the potential for higher production under this alternative (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), the impacts associated with these actions would likely be greater than those under alternatives B and C but are still expected to be at a moderate level. As under alternatives B and C, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Temporary impacts include dredging under the</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>88 acres of mud flats would result in short-term minor adverse impacts on wetlands and other waters of the U.S. because of temporary bottom disturbances. Standard BMPs would be used during the removal of racks to minimize sediment disturbances and water turbidity. The increase in turbidity would be highly localized and would occur over a two to three month period. Governmental permit authorization from the USACE would not likely be required. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>With respect to wetlands and other waters of the U.S., alternative A would be consistent with relevant law and policy. The natural recovery of wetlands would be consistent with NPS <i>Management Policies 2006</i> and DO-77-1, which sets a goal of a "net gain" of wetlands (NPS 2006d, 2002a). USACE would be consulted to determine whether the removal of commercial shellfish infrastructure would require permitting.</p>	<p>installed outside the harbor seal pupping season in 2014. Dredging and rack installation and repair would adversely impact the silted bottom of Drakes Estero. The post installation and rack repair would be conducted over a few months in each year, and impacts from dredging and post installation and rack repair would be expected to last one week (from disturbance) due to a localized increase in suspended sediments. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits, and complying with all permit conditions. By obtaining state and federal permits and complying with their conditions, DBOC would ensure that alternative B is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. DBOC has received written confirmation that shellfish operations fall within USACE jurisdiction and a permit application is required to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the USACE that any proposed fill is necessary because there are no practicable alternatives, as outlined in the EPA's section 404(b)(1) Guidelines" (USACE 2010).</p> <p>NWP 48, described under "Laws and Policies" in</p>	<p>under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Temporary impacts would be associated with dredging under the new dock in a 30- by 60-foot area where the old dock is located and the installation/replacement of new rack infrastructure, including between 1,700 and 2,500 2-inch by 6-inch posts in 2012 and 380 to 750 posts in 2014. These actions would adversely impact the silted bottom of Drakes Estero due to a localized increase in sedimentation during the period of construction. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining the relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative C is consistent with relevant law and policy related to the management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. For the reasons described under alternative B, dredging the area around the dock and installation of a new dock would not qualify for the NWP 48, and would require a separate USACE permit.</p> <p>USACE has provided written notification to DBOC</p>	<p>new dock (in a 30-by 60-foot area) at the onshore facilities and the installation/replacement of new rack infrastructure including between 1,700 and 2,500 2-inch by 6-inch posts in 2013 and 380 to 750 posts in 2014. DBOC would also place a new 1,050-foot water collection pipeline along the bottom of Drakes Estero using concrete anchors. The construction of a new processing facility would occur on existing uplands. These actions are expected to result in minimal short-term, adverse impacts due to an increase in local turbidity levels. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative D is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. Installation of the intake pipe, installation of a new dock, and dredging the area around the dock would require USACE permit authorization. NWP 48 (Commercial Shellfish Aquaculture Activities) was issued on February 21, 2012 with modifications. This permit authorizes "discharges of dredged or fill material in waters of the United States or structures or work in navigable waters of the United States necessary for commercial shellfish aquaculture</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>this section, authorizes "discharges of dredged or fill material in waters of the U.S. or structures or work in navigable waters of the U.S. necessary for commercial shellfish aquaculture operations in authorized areas" (33CFR 330[B][48]), provided notification is submitted to the USACE and includes a compensatory mitigation plan, habitat assessment, and assessment of impacts to eelgrass. Dredging the area around the dock and installing a new dock would not qualify for the NWP 48, and would require a separate USACE permit.</p> <p>Lastly, any future actions would be reviewed by NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>	<p>that the commercial shellfish activities in waters of the U.S. are regulated by USACE and has advised DBOC to submit an application to ensure that its activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines" (USACE 2010).</p> <p>Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>	<p>operations in authorized areas" (33CFR 330[B][48]). Dredging the area around the dock and installing a new dock would not qualify for NWP 48, and would require a separate USACE permit. USACE has provided written notification to DBOC that the activities are within USACE jurisdiction and has advised DBOC to submit a permit application to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency' Section 404(b)(1) Guidelines" (USACE 2010).</p> <p>Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock and placement of the water intake line) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Eelgrass			
<p>Overall, alternative A would result in long-term beneficial impacts on eelgrass habitat due to the termination of DBOC operations in Drakes Estero, the removal of scarring with discontinued use of motorboats in Drakes Estero, and the removal of structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for the expansion of invasive species (e.g., tunicates) and macroalgae. There may be some highly localized adverse impacts on eelgrass associated with the removal of the commercially grown shellfish because they provide some benefits associated with nutrient cycling and water filtration; however, the overall long-term impacts of alternative A on eelgrass would be beneficial. Alternative A also would result in short-term minor adverse impacts on eelgrass because removing infrastructure related to commercial shellfish operations would result in localized, slightly detectable increases in sedimentation that would last two to three months, reducing the amount of sunlight available for photosynthesis during that time. BMPs would be used to reduce turbidity effects from temporary resuspension of sediment during removal activities, and the overall impact would result in limited change to eelgrass meadows or natural processes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative A is consistent with relevant law and policy because it would preserve and enhance (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular</p>	<p>Overall, alternative B would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for another 10 years and the continued presence of commercial shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative B would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), potential boat wake erosion, and potential temporary increases in turbidity from sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that the amount of scarring under alternative B would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities and the presence of structures would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, the latter of which can compete with seagrasses for important resources like light. These effects would have a long-term moderate adverse impact on eelgrass, which would be readily apparent and would affect eelgrass meadows and natural processes (such as eelgrass colonization and regeneration) through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Mitigation for impacts to eelgrass</p>	<p>Overall, alternative C would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for an additional 10 years and the continued presence of shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative C would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that because the level of boat use would remain similar to existing conditions, the amount of scarring under alternative C would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. However, DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for <i>Didemnum</i> to spread to other areas in the Estero through fragmentation. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be</p>	<p>Overall, alternative D would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to an additional 10 years of DBOC operations. DBOC activities in Drakes Estero under alternative D would allow the continuation of and potential increase in actions associated with commercial shellfish operations that result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from sediment resuspension. It is anticipated that due to the likely increase in boat traffic and area of vessel operations that the potential for scarring may be increased from the levels observed in the 2010 aerial photography. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. These adverse impacts would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with the increased level of production (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), and the increased use of bags and racks in shellfish operations, but are still expected to be of a moderate intensity. Impacts would be readily apparent and would affect eelgrass meadows or natural processes (such as eelgrass colonization and regeneration). Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
<p>concern) under the Groundfish Plan; and (3) native species and natural processes encouraged by NPS <i>Management Policies 2006</i>.</p>	<p>would be required pursuant to California policy. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation sites. In general, impacts would be clearly detectable and could appreciably affect individuals or groups of species, communities, or natural processes. The NAS concluded that commercial shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset by the "rapid regeneration capacity" for eelgrass and that "eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration" (NAS 2009). Although there are some highly localized beneficial impacts on eelgrass associated with commercial shellfish operations, the overall impact of alternative B on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative B would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>	<p>localized around structures in Drakes Estero associated with commercial shellfish operations.</p> <p>In general, impacts would be readily apparent and would affect eelgrass meadows or natural processes through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. The NAS concluded that shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset by the "rapid regeneration capacity" for eelgrass and "that eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration" (NAS 2009). Although there would be some highly localized beneficial impacts on eelgrass associated with shellfish operations, the impact of alternative C on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With respect to eelgrass, alternative C would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>	<p>photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation-related structures. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to eelgrass, alternative D would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS <i>Management Policies 2006</i>.</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Wildlife and Wildlife Habitat: Benthic Fauna			
<p>Overall, alternative A would result in long-term beneficial impacts on native benthic fauna because the termination of DBOC operations and associated shellfish operations in Drakes Estero would remove shellfish operations from Drakes Estero and, therefore, reduce the risk for the spread of nonnative and invasive species in the future. Alternative A would result in the removal of structures related to shellfish operations in Drakes Estero. Some sediment re-suspension would be anticipated during the removal of the 7 acres of racks; however, any sedimentation resulting from this activity would be short-lived and would be reduced to the extent practicable using BMPs, making the impact undetectable in the benthic community and therefore negligible. Although artificial habitat for certain benthic species would be removed when DBOC's offshore infrastructure is removed, alternative natural habitats (e.g., eelgrass beds) would be expected to replace these structures. Further, the removal of structures under alternative A would remove substrates that support invasive tunicates and other fouling species. Native benthic species would benefit from the removal of offshore infrastructure, particularly from the approximately 88 acres of mudflats and sandbars where bottom bags can be placed (22 acres have been planted with bottom bags each of the past two years). Native benthic species are adapted to the soft-bottom habitat and eelgrass that would likely replace the structures related to shellfish operations once they are removed. The cumulative impact would be beneficial, and alternative A would contribute an appreciable beneficial increment to the beneficial cumulative impact.</p> <p>Alternative A would be consistent with the</p>	<p>Overall, alternative B would result in long-term moderate adverse impacts on native benthic fauna for an additional 10 years due to the continuation of DBOC operations and associated human activities in Drakes Estero, as well as the potential for such activities to introduce and/or facilitate the colonization of nonnative and invasive species. Specifically, the cultivation of nonnative species in Drakes Estero for an additional 10 years at production levels of 600,000 pounds of shellfish annually would result in the continued addition and subsequent harvest of approximately 7.06 million individual shellfish from Drakes Estero on an annual basis. Based on DBOC proof-of-use reports, the acreage of sandbars and mudflats occupied at this level of production would be 50 percent greater than that reported for 2008 in the 2009 NAS report. The effects on the natural benthic community from this would be readily apparent, including the continued use by nonnative species of resources that would otherwise be available to native species of bivalves and other benthic organisms, the introduction of molluscan diseases, and other harmful nonnative species being imported unintentionally (such as the invasive tunicate <i>Didemnum</i>). The use of both bottom bags and racks has been implicated in detectable changes in benthic communities. The continued maintenance and use of DBOC offshore infrastructure would result in a slight decrease in the abundance of certain benthic invertebrate species where the racks are currently located, while the continuation of bag cultivation in Drakes Estero would maintain artificial structured habitat for some benthic invertebrates. Rack repair and replacement would result in short-term negligible adverse impacts to benthic fauna, because the effects from these activities would not be</p>	<p>Overall, alternative C would result in long-term moderate adverse impacts on benthic fauna due to an additional 10 years of commercial shellfish operations and associated human activities in Drakes Estero and the potential for such activities to introduce nonnative species and to facilitate the colonization and expansion of invasive species. Although Manila clams would no longer be cultivated under this alternative, the cultivation of Pacific oyster in Drakes Estero would have readily apparent effects on the communities of natural benthic organisms, including increasing the risk of introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate <i>Didemnum</i>). As discussed under alternative B, DBOC's use of diploid stock rather than sterile triploid stock increases the risk of naturalization by cultivated species (NAS 2004), although the potential risk under alternative C would be incrementally less than under alternative B. DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for <i>Didemnum</i> to spread to other areas in Drakes Estero through fragmentation. The use of both bottom bags and racks has contributed to detectable changes in benthic communities. Because shellfish production limits would be less under alternative C compared to alternatives B and D, the level of impact on benthic fauna would be incrementally less; however, the impacts would still be readily apparent and would affect benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible (i.e., not detectable or measurable). Cumulative impacts</p>	<p>Overall, alternative D would result in long-term moderate adverse impacts on native benthic fauna due to an additional 10 years of DBOC operations and associated human activities in Drakes Estero. This would increase the potential for shellfish operations to introduce nonnative species to Drakes Estero and facilitate the colonization and expansion of invasive species. Specifically, the increase in shellfish production levels to 850,000 pounds shucked weight (approximately 10 million individual organisms harvested annually) represents a marked increase over alternatives B and C (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); therefore, it is assumed alternative D would result in the greatest level of impact on native benthic fauna among all alternatives. The cultivation of nonnative species in Drakes Estero would be readily apparent and would affect populations, natural processes, and/or the habitat of natural benthic organisms, including increasing the risk of introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate <i>Didemnum</i>). While certain species introduced under alternative D are native to the region (i.e., purple-hinged rock scallops and Olympia oysters), they are not abundant in Drakes Estero in adult form. The use of both bottom bags and racks has contributed to detectable changes in benthic communities. These impacts would continue to be readily apparent, affecting benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible. Cumulative impacts would be long term, moderate, and</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>guidance set forth in NPS <i>Management Policies 2006</i> for the maintenance and restoration of natural native ecosystems, including the eradication of nonnative species where these species interfere with natural processes and habitat (NPS 2006d). Alternative A would also be consistent with Executive Order 13112 regarding invasive species management. Finally, alternative A would be consistent with the California MLPA, regarding protection of marine life and habitats, marine ecosystems, and marine natural heritage, and improvements to recreational, educational, and study opportunities provided by marine ecosystems subject to minimal human disturbance.</p>	<p>detectable or measurable. Activities such as continued maintenance and harvesting would allow for incidental mortality to continue, as described above, which would have an adverse impact on native bivalves. Further, the continued use of offshore infrastructure would maintain the potential for <i>Didemnum</i> expansion, and associated shellfish operations (such as continued infrastructure maintenance, vessel traffic, and harvesting) would pose a risk for further dispersal of this nonnative invasive tunicate via colonial fragments. The potential for increase in overall coverage of <i>Didemnum</i> would have an adverse impact on species diversity. Lastly, the nonnative Manila clam and Pacific oyster would continue to be produced under this alternative, increasing their chance for naturalization (NAS 2004, 2009; Grosholz 2011b). DBOC's use of diploid stock rather than sterile triploid stock further increases the risk of naturalization by cultivated species (NAS 2004). These impacts would be readily apparent on the populations, natural processes, and/or habitat of benthic organisms in the project area. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The shellfish species that could be cultivated under this alternative are nonnative, with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in</p>	<p>would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of the policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. All species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative C would not be consistent with Executive Order 13112 regarding invasive species management.</p>	<p>adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS <i>Management Policies 2006</i> in that it would not further the goal of these policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero, and the Olympia oyster, which also prefers a hard substrate and is not abundant in adult form in Drakes Estero. Additionally, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per <i>Management Policies 2006</i> (NPS 2006d) or regulations. Further, alternative D would not be consistent with Executive Order 13112 regarding invasive species management.</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative B would not be consistent with Executive Order 13112 regarding invasive species management.</p>		
Wildlife and Wildlife Habitat: Fish			
<p>Overall, alternative A would result in long-term beneficial impacts on fish due to the restoration of natural fish habitat, including the restoration of natural eelgrass beds that serve as essential fish habitat for a variety of Pacific groundfish identified in the Groundfish Plan (PFMC 2008). Alternative A would result in a more natural species composition and spatial distribution of fish in the project area, which would likely result in minor adverse impacts on fish due to slightly detectable decreases in the abundance of structure-oriented fish species and their prey. Alternative A would also result in short-term minor adverse impacts on fish species because the disruption of fish during rack removal from Drakes Estero would be slightly detectable and would affect only a small portion of the population and/or habitat in the project area. Combined with the removal of a source of marine debris, changes resulting from this alternative would return the Drakes Estero ecosystem to a more natural state for the overall fish community. The cumulative impact for alternative A would be beneficial and would contribute a noticeable beneficial increment to the overall cumulative impact.</p> <p>Alternative A would be consistent with the guidance set forth in NPS <i>Management Policies 2006</i> for the maintenance and restoration of natural native ecosystems, including the restoration of native fish communities (NPS 2006d). Additionally, this alternative would be consistent with the goals set forth in the</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on fish because, as discussed above, impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural processes, and/or their habitat within the project area. While the natural species composition would remain altered due to the presence of nonnatural structured habitat, these alterations would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Additionally, eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The continued maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish identified in the Groundfish Plan (PFMC 2008). Shellfish rack repair and replacement would have the potential to degrade fish habitat by affecting water quality, but impacts would be short term due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the population or their natural processes and/or habitat in the project area. The cumulative impact</p>	<p>Overall, alternative C would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is identified as essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative C would contribute a noticeable adverse increment to the overall beneficial cumulative impact.</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the beneficial cumulative impact.</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Magnuson-Stevens Fishery Conservation and Management Act because the essential fish habitat (habitat of particular concern) designated in the Pacific Fishery Management Council's Groundfish Plan would be maintained and improved.	would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall beneficial cumulative impact. With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.	With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.	With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS <i>Management Policies 2006</i> to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) within the Pacific Fishery Management Council's Groundfish Management Plan, would continue.

Wildlife and Wildlife Habitat: Harbor Seals

Overall, alternative A would result in long-term beneficial impacts on harbor seals due to the termination of DBOC operations and associated human activities in Drakes Estero. Disturbance to harbor seals would be limited to recreational kayakers (outside of the harbor seal pupping season), hikers on the adjacent landscape and shoreline, and aircraft. Further, the termination of shellfish operations in Drakes Estero could benefit the distribution and abundance of the native harbor seal population, and could result in expansion of available habitat for harbor seals. Alternative A could also result in short-term minor adverse impacts associated with rack removal,	Overall, alternative B would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained as part of the new SUP issued to DBOC, alternative B would result in moderate	Overall, alternative C would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative C would result in moderate	Overall, alternative D would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative D would result in moderate adverse
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TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>which would be localized and slightly detectable but would not affect the overall structure of the natural community (i.e., would affect only a small segment of the harbor seal population, natural processes, or habitat in the project area). These activities would be conducted outside the harbor seal pupping season to minimize adverse impacts. The cumulative impact would be long term and beneficial, including the removal of marine debris from Drakes Estero, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative A would be consistent with NPS policy because the removal of DBOC operations from Drakes Estero would remove an unnatural stimulus that is correlated with changes in harbor seal behavior. Similarly, the decrease in potential disturbance of this species would be consistent with MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107) by avoiding any potential take (as described above) of marine mammals and by maintaining the health and stability of the marine ecosystem.</p>	<p>adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of marine debris into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative B would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS <i>Management Policies 2006</i> specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to</p>	<p>adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the commercial shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative C would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that is negatively correlated with harbor seal use of haul-out sites. NPS <i>Management Policies 2006</i> specify that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of</p>	<p>impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the commercial shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The adverse impacts associated with alternative D would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with increased production levels (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); however, these impacts are still expected to be moderate in intensity. The cumulative impact would be long term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>With respect to harbor seals, alternative D would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS <i>Management Policies 2006</i> specify that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.</p>	<p>pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.</p>	<p>prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, "take" is defined as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." "Harassment" is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.</p>
Wildlife and Wildlife Habitat: Birds			
<p>Overall, alternative A would result in long-term beneficial impacts on birds due to the removal of the commercial shellfish operation in Drakes Estero and its associated human activities. The removal of DBOC motorboats and related activities would minimize the disruption of biological activities such as foraging and resting for various types of birds that use Drakes Estero. Intertidal areas previously used by DBOC for the bottom bag cultivation in commercial operations would result in up to 88 additional acres of foraging, roosting, and resting habitat for resident and migratory birds. This increase in bird habitat would have greater importance for spring migrating birds, like the Pacific black brant, and natural processes would be enhanced due to the closure of Drakes Estero to all recreational boat access during the seal pupping season (March 1 – June 30). Alternative A may result in adverse impacts on birds from rack removal, due to the removal of food sources and resting habitat</p>	<p>Alternative B would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. As described above, the impacts of alternative B on birds would result in readily apparent effects on bird populations, natural processes, and habitat within the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris</p>	<p>Alternative C would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and associated human activities in Drakes Estero for an additional 10 years. The impacts of alternative C on birds would result in readily apparent effects on bird populations, natural processes, and habitat in the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be</p>	<p>Alternative D would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. The adverse impacts could be incrementally greater under this alternative than under alternatives B and C due to the potential for increased motorboat activities. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>associated with the racks. However, these adverse impacts would be expected to be short term and minor because they would affect a small segment of bird populations, their natural processes, and habitat in the project area. Further, the removal of shellfish racks would eliminate unnatural habitat features and restore natural bird habitats in Drakes Estero. Under this alternative, birds would benefit from the removal of all racks and bags, thereby eliminating the potential for ingestion of debris from the commercial shellfish operation. Cumulative impacts would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impacts.</p> <p>Alternative A would be consistent with the goals set forth in both NPS <i>Management Policies 2006</i> and the MBTA. NPS <i>Management Policies 2006</i> specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). The MBTA (16 USC 703–712, as amended) makes it illegal for people to “take” migratory birds, or their eggs, feathers, or nests. Additionally, alternative A would be consistent with Executive Order 13186 and the NPS MOU with USFWS, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions (NPS and USFWS 2010).</p> <p>As described in Hickey et al. (2003) and other bird</p>	<p>fragments would be minimal because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures in Drakes Estero, would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall impact.</p> <p>With respect to birds, alternative B would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative B would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway</p>	<p>minor because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With respect to birds, alternative C would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative C would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway</p>	<p>would be minor because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The impacts of alternative D on birds would result in readily apparent effects on bird populations, natural processes, and habitat within the project area. The cumulative impact would be long-term moderate adverse, and alternative D would contribute an appreciable adverse increment to the overall impact.</p> <p>With respect to birds, alternative D would not be consistent with the goals set forth in the NPS <i>Management Policies 2006</i>, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative D would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>conservation plans, because of restrictions on human activity (including kayaking and shellfish operations during the March 1 – June 30 seal pupping closure) and further alteration of tidal habitat, alternative A would be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative A would also be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, the removal of DBOC shellfish operations would be expected to positively influence birds and bird habitat by supporting conservation strategies outlined in bird conservation plans.</p>	<p>Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative B would not be consistent with the NPS commitment to Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative B would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative B would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continuing alteration of tidal habitat, alternative B would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative B would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative B would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>	<p>Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative C would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative C would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative C would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative C would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative C would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative C would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>	<p>populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative D would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative D would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative D are consistent with the MBTA (16 U.S.C. 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.</p> <p>As described in Hickey et al. (2003) and other bird conservation plans, by allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative D would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative D would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative D would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
Special-Status Species			
<p>Overall, alternative A would result in a long-term beneficial impact on central California Coho salmon critical habitat and the central California steelhead. Alternative A could also result in short-term minor adverse impacts on these federally protected resources during the removal of DBOC facilities and personal property because these activities could disturb individuals or cause temporary sedimentation in designated critical habitat. The short-term impacts related to removal would be highly localized and would last for a period of two to three months. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative A would be consistent with relevant law and policy. Alternative A would forward the goal set forth in <i>NPS Management Policies 2006</i>, which states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). Alternative A would also fulfill the federal mandate set forth by the ESA to conserve listed species and to ensure that the proposed actions do not jeopardize the continued existence of the listed species.</p>	<p>Overall, alternative B would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt a small proportion of the individuals and/or designated critical habitat in the project area. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and slightly detectable adverse impacts on Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative B would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a few months each year (outside of the seal pupping season) that would cause slightly detectable impacts to federally listed individuals or populations and critical habitat within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central</p>	<p>Overall, alternative C would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt individuals and/or designated critical habitat within the project area. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative C would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a period of two to three months per year that would be slightly detectable within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution is limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on designated central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized (affecting a small proportion of the designated Coho salmon critical habitat and steelhead within the project area). Damage to eelgrass habitat and reduction in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative D would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks could cause localized sedimentation for a few months each year during 2013 and 2014 (outside of the seal pupping season) that would be slightly detectable within the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from commercial shellfish operation debris would not affect the overall structure of any</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative B would be consistent with relevant law and policy. However, alternative B would not fulfill the goals articulated in NPS <i>Management Policies 2006</i> as well as alternative A would. NPS <i>Management Policies 2006</i> states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>	<p>beneficial, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative C would be consistent with relevant law and policy. However, alternative C would not fulfill the goals articulated in NPS <i>Management Policies 2006</i> as well as alternative A would. NPS <i>Management Policies 2006</i> states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>	<p>natural community. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the overall cumulative impact.</p> <p>For central California Coho salmon critical habitat and the central California steelhead, alternative D would be consistent with relevant law and policy. However, alternative D would not fulfill the goals articulated in NPS <i>Management Policies 2006</i> as well as alternative A would. NPS <i>Management Policies 2006</i> states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.</p>
Coastal Flood Zones			
<p>Overall, alternative A would result in long-term beneficial impacts on the coastal flood zone due to an increase in the flood storage capacity of the onshore area and the removal of structures and materials that have the potential to become dislodged and spread into habitat buffer areas, such as tidal vegetated wetlands and shorelines, during a flood event. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impacts.</p> <p>With respect to coastal flood zones, alternative A</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on the coastal flood zone within the project area for an additional 10 years because continued DBOC operations would take place within the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities, and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and would not increase the potential for flood damage. Offshore structures and materials could be damaged</p>	<p>Overall, alternative C would result in long-term minor adverse impacts on the coastal flood zone within the project area for an additional 10 years because continued DBOC operations would take place within the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and would not increase the potential for flood damage. Offshore structures and materials could be damaged</p>	<p>Overall, alternative D would result in long-term minor to moderate adverse impacts on the coastal flood zone due to continued shellfish operations. Structures would remain within the flood zone, which could result in an increased potential for flood damage to property or environmental contamination at the project site. Alternative D impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surges would be readily apparent. The additional infrastructure proposed under this alternative at the onshore facilities could result in the increased potential for flood damage within the project area</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>would be consistent with relevant law and policy. The removal of structures and residences in the flood zone would fulfill the goals set forth by Executive Order 11988, "Floodplain Management" and the subsequent NPS DO 77-2 and <i>Procedural Manual 77-2: Floodplain Management</i>, which are intended to properly conserve, manage, and protect flood zones on NPS lands to protect human health and the environment and prevent damage to property in the event of a flood event.</p>	<p>and/or dislodged during a flood event, potentially causing damage to resources within Drakes Estero. Onshore, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent. Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.</p> <p>NPS guidelines require that new actions within the flood zone comply with <i>Procedural Manual 77-2: Floodplain Management</i>. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with <i>Procedural Manual 77-2</i> guidelines. No new structures would be constructed under alternative B. As such, this alternative would comply with existing NPS guidelines and procedures.</p>	<p>and/or dislodged during a flood event, potentially causing damage to resources within Drakes Estero. At the onshore facility, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent. Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>NPS guidelines require that new actions within the flood zone comply with <i>NPS Procedural Manual 77-2: Floodplain Management</i>. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with <i>Procedural Manual 77-2</i> guidelines. No new structures would be constructed under alternative C. As such, this alternative would comply with existing NPS guidelines and procedures.</p>	<p>compared to other alternatives. However, this could be mitigated by following guidelines set forth in <i>NPS Procedural Manual 77-2</i>, complying with Marin County building codes and FEMA recommendations for structures in the flood zone, and implementing architectural design elements specific to minimizing flood damage. Compared to alternatives B and C, alternative D would result in a slight increase of flood zone impacts from the offshore facilities due to additional racks and bottom bags to accommodate the higher shellfish production level. The construction of new facilities may take place in the flood zone if alternative site locations outside the flood zone but within the SUP area were determined to be infeasible through a subsequent planning process. If located within the flood zone, the new facility would result in continued potential for flood damage to property and/or environmental contamination at the project site. Wastewater collection systems would remain as described in alternatives B and C, and flood zone impacts from other structures (punching shed, stringing shed, dock, washing station, and mobile homes) would be the same as those under alternatives B and C. An increase in production would likely result in additional shell being added to the shell piles located within the flood zone, resulting in a reduction of flood storage capacity. The cumulative impact would be long term minor to moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative D would include new onshore development, which is a Class I Action as specified in the <i>NPS Procedural Manual 77-2: Floodplain Management</i>. As such, the new structure would require a SOF if alternative site locations outside the coastal flood zone, but within the SUP area, were determined to be infeasible.</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
			<p>The SOF process would ensure that the structure is properly designed and constructed in a way that minimizes impacts to the flood zone. However, any remaining structures are grandfathered, and do not have to comply with these guidelines.</p>
Water Quality			
<p>Drakes Estero is not a highly turbid coastal embayment (NAS 2009), and based on west coast research (Dumbauld, Ruesink, and Rumrill 2009), the beneficial biochemical effects typically attributed to bivalves, such as nutrient cycling and water clarity, are expected to be highly localized in Drakes Estero. This is because the nutrient dynamics in these systems are driven by coastal upwelling and a strong tidal cycle rather than by bioprocesses from shellfish. However, bivalves remove particulates in the water column that may influence eelgrass productivity near beds and racks (see discussion under alternative B).</p> <p>Overall, alternative A would result in long-term beneficial impacts on water quality as a result of reduced non-point-source runoff and the elimination of future disturbances to the Drakes Estero bottom from boats and offshore structures. No releases of toxic levels of copper from wood preservatives would be expected under this alternative. The removal of the racks and bags would cause a short-term minor adverse impact on water quality due to the sediment disturbances from personnel removing the offshore structures. These adverse impacts would be temporary and localized. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impact.</p> <p>With regard to water quality, alternative A would</p>	<p>Overall, this alternative would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative B would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Cultivated shellfish as filter feeders would remain in Drakes Estero under this alternative, offering localized long-term beneficial impacts on water quality by removing suspended solids, nutrients, and phytoplankton from the water column. Sediment disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity that would be mitigated by a floating silt screen. This alternative would include the replacement of between 1,700 and 2,500 posts in 2013 and between 380 and 750 posts in 2014 which also result in short-term adverse impacts on water quality as the sediment is disturbed. The use of pressure treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing</p>	<p>Overall, alternative C would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative C would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) but would not alter natural water quality conditions in the project area. Alternative C would have recurring but not long-lasting effects on water quality. Cultivated shellfish would remain in Drakes Estero for another 10 years under this alternative, offering localized beneficial water filtering functions from the removal of suspended solids, nutrients, and phytoplankton from the water column. Impacts on water quality would include those described under alternative B. In particular, sediment disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. This alternative would include the replacement of between 1,700 and 2,500 posts in year 2013 and between 380 and 750 posts in 2014, which would also result in short-term adverse impacts on water quality due to sediment disturbance. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper</p>	<p>Overall, alternative D would have short-term minor adverse as well long-term minor adverse impacts on water quality for 10 more years due to offshore and onshore activities associated with commercial shellfish operations in Drakes Estero. Alternative D would not be expected to exceed water quality standards, have long-lasting effects on water quality or impede the goals and objectives of NPS policies on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Alternative D would have the highest population of cultivated shellfish occupying Drakes Estero. As a result, the localized water quality benefits from filter feeding bivalves would be greater compared to the other alternatives. The impacts associated with alternative D would be similar to those described under alternatives B and C. However, this alternative may cause slightly higher rates of sediment disturbance in Drakes Estero compared to alternatives B and C due to more frequent boat trips and bag/tray management. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
<p>Action/Impact</p> <p>satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”</p>	<p>Action/Impact</p> <p>copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. The point-source discharges (washing station and setting tanks) under this alternative would continue, but no new point-source outputs would be introduced. Point-source discharges would include water from the washing station after sediments and fouling organisms are filtered from the sediment basin resulting in beneficial impacts; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point-source pollution from runoff associated with the onshore facilities is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the cumulative impact.</p> <p>With regard to water quality, alternative B would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”</p>	<p>Action/Impact</p> <p>into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity, resulting in short-term adverse impacts on water quality. Standard BMPs would be employed during dredging such as the use of a floating silt screen. Point-source discharges would include discharging water from the washing station after marine sediments and fouling organisms are filtered and removed from the new sediment basin; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point source pollution from runoff at the onshore facility is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impacts.</p> <p>With regard to water quality, alternative C would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”</p>	<p>Action/Impact</p> <p>column from increased turbidity, resulting in short-term minor adverse impacts on water quality. Standard BMPs, such as the use of a floating silt screen, would be employed during dredging. Onshore discharge into Drakes Estero of pumped water serving the washing station and setting tanks would be filtered using the new sediment basin, resulting in beneficial impacts on water quality. In addition, onshore sediment may enter waters due to the construction of new facilities, although this action could be mitigated through a site-specific construction plan and the use of standard BMPs. Alternative D also would result in short-term minor adverse impacts on water quality during the construction of new DBOC facilities because impacts would include temporary (lasting less than a year), localized impacts that would not have long-lasting effects on water quality. The cumulative impact would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.</p> <p>With regard to water quality, alternative D would satisfy the goals and objectives of NPS <i>Management Policies 2006</i> (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”</p>
Soundscapes			
<p>Alternative A would result in long-term beneficial impacts due to the elimination of human-caused noise levels associated with the commercial shellfish operation. The noise associated with the use of heavy machinery and motorized boats to remove DBOC structures and property would be at a level that would cause vocal communication</p>	<p>Overall, alternative B would result in long-term major adverse impacts on the natural soundscape from continued DBOC operations because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be</p>	<p>Overall, issuance of a 10-year SUP under alternative C would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by</p>	<p>Overall, issuance of a 10-year SUP under alternative D would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
<p>Action/Impact</p> <p>to be difficult at a distance of less than 16 feet. However, this impact would interfere with the natural soundscape for less than 5 percent of one year; therefore, alternative A would result in short-term minor adverse impacts on soundscapes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative A would further the goals for soundscape management as set forth in relevant law and policy. NPS <i>Management Policies 2006</i> and <i>Director's Order 47: Soundscape Preservation and Noise Management</i> direct NPS managers to preserve and restore the natural soundscape, where possible.</p>	<p>Action/Impact</p> <p>interfered with more than 10 percent of the time. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative B would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative B would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative B would include continued impacts on the natural soundscape from DBOC activities. This aspect of Alternative B would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise far in excess of 60 dBA at 50 feet. In addition to DBOC trucks and processing station equipment, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for rare use by NPS for administration of the wilderness in accordance with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also</p>	<p>Action/Impact</p> <p>16 feet, and the natural soundscape is interfered with more than 10 percent of the 10-year permit. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of the racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative C would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative C would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative C would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative C would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally by NPS for administration of the wilderness in accordance</p>	<p>Action/Impact</p> <p>16 feet, and the natural soundscape is interfered with more than 10 percent of the time. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of onshore facilities as well as the repair and replacement of racks in Drakes Estero. Alternative D would also result in short-term major adverse impacts on the natural soundscape due to the use of heavy machinery during development of additional onshore facilities because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the year during which onshore construction would take place. The cumulative impact would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.</p> <p>With regard to soundscapes, alternative D would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS <i>Management Policies 2006</i> (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative D would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative D would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally by NPS for administration of the wilderness in accordance</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."	with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."	with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under "Impacts on Wilderness."
Wilderness			
<p>Overall, alternative A would result in long-term beneficial impacts on wilderness because the cessation of DBOC operations and removal of DBOC facilities would result in a readily apparent, widespread enhancement of wilderness character. The enhancement of wilderness character would be due to the removal of a commercial shellfish operation that detracts from wilderness character, including:</p> <ul style="list-style-type: none"> ▪ removal of nonnative shellfish cultivation (approximately 585,000 pounds in 2010); this equates to approximately 6 million oysters ▪ removal of human-made infrastructure associated with commercial shellfish operations, including 5 miles (7 acres) of racks and up to 88 acres of bottom bags in up to 142 acres of Drakes Estero ▪ discontinuation of motorboat operations, including use of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; and discontinuation of ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring as documented in the "Impacts on Eelgrass" section ▪ discontinuation of noise sources associated with commercial operation affecting wilderness <p>Alternative A would also result in short-term minor</p>	<p>Overall, alternative B would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 600,000 pounds per year, otherwise expressed as approximately 7.06 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 5 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness) 	<p>Overall, alternative C would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 500,000 pounds per year, otherwise expressed as approximately 5.88 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness) 	<p>Overall, alternative D would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include</p> <ul style="list-style-type: none"> ▪ continued cultivation of nonnative shellfish (up to 850,000 pounds per year, otherwise expressed as approximately 10 million oysters annually) ▪ continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero ▪ continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass" ▪ continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness)

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
<p>Action/Impact</p> <p>adverse impacts on wilderness because activities related to the removal of racks would detract from offering outstanding opportunities for solitude in highly localized areas of the congressionally designated wilderness in Drakes Estero. The cumulative impact would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.</p> <p>Alternative A would enable NPS to fulfill its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d).</p>	<p>Action/Impact</p> <p>The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative B would prevent NPS from fulfilling its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation. However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to the existing commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.</p>	<p>Action/Impact</p> <p>The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.</p> <p>Alternative C would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.</p>	<p>Action/Impact</p> <p>The cumulative impact on wilderness would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impacts.</p> <p>Alternative D would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS <i>Management Policies 2006</i> to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years. Collection of larvae is considered and analyzed as part of this alternative; however, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per <i>Management Policies 2006</i> (NPS 2006d), or regulations.</p>
Visitor Experience and Recreation			
Overall, alternative A would result in a long-term beneficial or long-term minor adverse impact on visitor experience and recreation, depending on the interests of the visitor. From the perspective of	Overall, alternative B would result in short-term minor adverse impacts as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project area for	Overall, alternative C would result in short-term minor adverse and long-term minor adverse or long-term beneficial impact on visitor experience and recreation in the project area for an additional	As described above, alternative D would result in short-term moderate adverse as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>visitors seeking a natural park experience in Drakes Estero, alternative A would be beneficial because it would increase these opportunities. Alternative A would maintain visitor access to Drakes Estero, limiting access to recreational boaters only during the annual seal pupping season (March 1 to June 30). As described above, those looking to experience an active commercial shellfish operation would be adversely impacted by alternative A because they would no longer have this opportunity in the Seashore. The latter group of visitors composes up to 2.5 percent of the total visitors to the Seashore. Therefore, at a Seashore-wide scale, the adverse impacts associated with this alternative would affect a small portion of Seashore visitors. The cumulative impact would be long term and beneficial or long term, minor, and adverse, and alternative A would contribute an appreciable beneficial or noticeable adverse increment to the overall cumulative impacts.</p> <p>With respect to visitor experience and recreation, alternative A would be consistent with relevant law and policy because the removal of DBOC would not represent the loss of a visitor service. Visitor services are defined by law as public accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the Seashore (36 CFR 51.3).</p>	<p>an additional 10 years, depending on the interests of the visitor. Impacts from continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience in Drakes Estero, including those interested in experiencing solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music while working, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations would also detract from the natural environment. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative B to have a beneficial impact because DBOC would continue to offer experiences such as educational tours and services and fresh oysters to visitors. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative B would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact. In the short term, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular</p>	<p>10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. Specifically, from the perspective of those seeking a natural park experience in Drakes Estero, including those looking to experience solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of the resources for which the Seashore was established. DBOC operations would be generally unchanged under alternative C for an additional 10 years despite some modifications proposed to the existing facilities and production levels. The visitor experience and recreational opportunities at the site would be similar to current conditions, except that the existing, unpermitted picnic area, located adjacent to the retail area and away from the shoreline, would be removed and would be replaced by NPS with another picnic area nearby. Visual and sound disturbances associated with commercial shellfish operations would be apparent in the project area, although the associated impacts would be mostly limited to those visitors looking to enjoy a natural park experience in Drakes Estero. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. This debris also would continue to wash up on surrounding shorelines and beaches. In addition, motorized boats would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the natural environment. Visitors to the Seashore who</p>	<p>area for an additional 10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Similar to alternatives B and C, visual and sound disturbances associated with commercial shellfish operations could be readily apparent in the project area, and this impact would be particularly adverse for visitors seeking a natural park experience in Drakes Estero. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area, and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to use radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the natural environment. These adverse impacts would be greater than under alternatives B and C due to the increased production limits (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), which would likely increase motorized boat activity and the quantity of bags and other items associated with shellfish operations in Drakes Estero. Visitors to the Seashore who are interested in experiencing an</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
	<p>maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.</p> <p>With respect to visitor experience and recreation, this alternative would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.</p>	<p>are interested in experiencing an active commercial shellfish operation would consider alternative C to have a beneficial impact because DBOC would continue to offer visitor experiences such as educational tours and services and fresh oysters. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative C would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.</p> <p>In the short term, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.</p> <p>With respect to visitor experience and recreation, alternative C would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.</p>	<p>active shellfish operation may consider alternative D to have a greater beneficial impact on visitor experience and recreation than the other alternatives because under this alternative the new facilities would enhance interpretation and educational opportunities at DBOC. However, in the short term, construction activities associated with alternative D could result in adverse impacts on visitor experience and recreation in Drakes Estero for both types of visitors. In particular, such activities could further disturb soundscapes and views in Drakes Estero and could temporarily limit interpretive and educational experiences at DBOC. In addition, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, also would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors. The cumulative impact on visitor experience and recreation would be long term, minor, and adverse or long term and beneficial, and alternative D would contribute a noticeable adverse and appreciable beneficial increment to the cumulative impact.</p> <p>With respect to visitor experience and recreation, alternative D would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of "visitor service"]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
			Estero was congressionally designated as wilderness.
Socioeconomic Resources			
<p>Overall, alternative A would result in long-term minor adverse impacts on local and regional socioeconomic resources. DBOC staff and their families would experience a direct adverse impact under alternative A due to the loss of jobs and housing. However, from a regional socioeconomic perspective, these impacts would be minimal and would not affect the overall regional economy. Based on employment, payroll, and revenue, DBOC accounts for 0.006 percent of the total value added in Marin County. DBOC staff composes 0.01 percent of the Marin County population and 2.1 percent of the Inverness population (U.S. Census Bureau 2010). Jobs lost in connection with the closure of DBOC make up only a small percentage of the total labor force for Marin and Sonoma counties and Inverness CDP, and even with the added job loss, assuming these jobs are not replaced by expanded shellfish operations elsewhere, unemployment rates in Marin County and Inverness CDP would be well below statewide averages of 12.4 percent (U.S. Department of Labor 2011). In addition, the relocated households encompass a small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.5 percent of the homes in Inverness CDP) (U.S. Census Bureau 2010). Therefore, even if all former staff relocates to another community and/or county, the impact on the regional economy would be minimal. Additionally, it is assumed that the Seashore, as a whole, would continue to contribute to the regional economy at current levels through local spending (approximately \$85</p>	<p>Overall, alternative B would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially from current levels, and DBOC would continue to provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative B would contribute a noticeable beneficial increment to the cumulative impact.</p>	<p>Overall, alternative C would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially, and DBOC would provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative C would contribute a noticeable beneficial increment to the cumulative impact.</p>	<p>Overall, alternative D would result in long-term beneficial impacts on local and regional socioeconomic resources. Option 1 of alternative D would not change the availability of housing for DBOC staff and their families. In contrast, Option 2 of alternative D, which would include the elimination of four on-site housing units, would have an adverse direct impact on DBOC staff and the families that live on site.</p> <p>Under both options, DBOC would maintain its contributions to the regional economy in a manner similar to current conditions for an additional 10 years, with some exceptions; however, due to expanded opportunities for product diversification, these contributions could be slightly increased.</p> <p>The potential for increased shellfish production under alternative D could result in an increase in DBOC staff, providing additional jobs for local workers. Although the new facilities at DBOC could minimally increase visitation to the commercial shellfish operation, it is assumed that visitor spending associated with the Seashore as a whole would continue at current levels.</p> <p>The relocated households proposed under Option 2 represent a very small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.4 percent of the homes in Inverness CDP) (U.S. Census Bureau 2005-2009). Therefore, even if all DBOC staff who currently reside in on-site housing move to another community and/or</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>million in 2010) and by supporting jobs (resulted in \$12 million in added value to the region in 2010) (NPS 2011d). The cumulative impact on the local and regional economy would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.</p> <p>Alternative A could result in long-term major adverse impacts on California's shellfish market because DBOC produces 16 to 35 percent of the oysters harvested in California and 13 to 33 percent of the total shellfish grown in the state. The cessation of commercial shellfish operations in Drakes Estero would be readily apparent and could substantially influence the production of shellfish in California. The cumulative impact on the California shellfish market would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.</p>			<p>county, the impact on the local and regional economy would be minimal. Additionally, some short-term jobs would be created once new onshore facilities are approved by the NPS and developed by DBOC. The cumulative impact on the regional economy would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.</p> <p>Both Option 1 and Option 2 of alternative D would result in long-term beneficial impacts on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market for an additional 10 years. Additionally, the increased production limits proposed under this alternative would allow DBOC to cultivate more diverse and larger quantities of shellfish, including the purple-hinged rock scallop and the Olympia oyster, which are not currently produced at DBOC. These increased production limits could result in DBOC increasing its contribution to the California shellfish market. The cumulative impact on statewide shellfish production would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.</p>
NPS Operations			
<p>Overall, alternative A would result in long-term minor adverse impacts on NPS operations because impacts would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore. While existing NPS staff would be required for monitoring and enforcement during the Drakes Estero boat closure period, the installation of an access gate would increase effectiveness of the closure and further protect harbor seal pupping habitat. Two new part-time</p>	<p>Overall, alternative B would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP. In addition, two half-time (seasonal) positions would conduct monitoring and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to</p>	<p>Overall, alternative C would result in a long-term minor adverse impact on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP and two part-time (seasonal) staff who would assess, monitor, and manage invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage</p>	<p>Overall, alternative D would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one dedicated FTE position to coordinate Seashore oversight and enforcement of all aspects of the SUP. The NPS would oversee and enforce all aspects of the operation in the permit area. Construction on new onshore facilities also would require one 2-year planning position to oversee additional planning and compliance associated with the proposed onshore</p>

TABLE 2-6. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Alternative A	Alternative B	Alternative C	Alternative D
Action/Impact	Action/Impact	Action/Impact	Action/Impact
<p>(seasonal) positions also would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These efforts would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.</p>	<p>development evaluated at the conceptual level in alternative D. The staff increase under alternative D also would include two half-time FTEs who would conduct assessment, monitoring, and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact on NPS operations would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.</p>

ENDNOTES

i. DBOC 2010c, Attachment 10c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010 regarding culture beds (November 2007). This attachment is a map depicting the beds within Drakes Estero as of November 2007. The map notes 147 acres of cultivation; however, the measurement contained within this document (142 acres) is based on GIS measurements of a digitized version of this map.

ii. DBOC 2011e, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 15, 2011, regarding Lease M-438-01 lease line.

“The California Department of Fish and Game (CDFG) informed Drakes Bay Oyster Company (DBOC) that the original Drakes Estero lease boundary lines were drawn on the kitchen table of Charlie Johnson’s home. The intent, at the time, was to create a lease area that included all of the existing shellfish beds. The crude mapping method used, without benefit of current, modern-day technology, not surprisingly turned out to be inaccurate and resulted in an error. Many years later, CDFG realized that the rudimentarily-drawn lease lines errantly crossed Bed 6.”

iii. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster rack GPS data. This attachment is a spreadsheet listing rack condition, length, and GPS location.

iv. DBOC 2010h, Letter from Drakes Bay Oyster Company to California Department of Fish and Game on May 10, 2010, regarding Lease M-438-01—boundary revision.

“Drakes Bay Oyster Company (DBOC) requests that the revised lease boundary lines be approved so that the historic oyster racks can remain in use as they have for roughly 50 years and the lease line can be moved away from the seal haul out area along the main channel.”

v. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.10 of Consent Order).

“Presently, and since Drakes Bay Oyster Company has been in contract with the California Department of Fish and Game under lease numbers M438-01 and M438-02, oyster have only been grown in the ‘cultivation area’ as defined in provision 3.2.11. No oysters will be grown outside of this cultivation area. The oysters currently being cultivated in Drakes Estero are Pacific oysters (*Crassostrea gigas*).”

vi. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008 regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.10 of Consent Order).

“Small numbers of European flat oysters (*Ostrea edulis*) and Kumamoto oysters (*Crassostrea sikamea*), which were planted by the Johnson’s Oyster Company prior to 2005, still exist within the cultivated area.”

vii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“At the time of the referenced DBOC letter to the CCC, DBOC was under the belief that the Johnson’s grew European flat oysters in Drakes Estero. Later, DBOC was informed by members of the Johnson family, and by CDFG, that no European flat oysters were produced in Drakes Estero.”

viii. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008 regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.10 of Consent Order).

“Small numbers of European flat oysters (*Ostrea edulis*) and Kumamoto oysters (*Crassostrea sikamea*), which were planted by the Johnson’s Oyster Company prior to 2005, still exist within the cultivated area.”

ix. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.10 of Consent Order).

“No oyster species other than the Pacific oyster and the European flat oyster will be planted in Drakes Estero by the Drakes Bay Oyster Company without prior approval from the California Department of Fish and Game, the California Fish and Game Commission and the California Coastal Commission. Kumamoto oysters are slow growing, and require approximately double the amount of time that the Pacific oyster takes to reach maturity. Most of the Kumamoto oysters that exist in Drakes Estero are now reaching maturity. Drakes Bay oyster Company will remove all of these Kumamoto oysters from Drakes Estero by August, 2008.”

x. CDFG 2008b, Letter from Senior Fish Pathologist, California Department of Fish and Game to Drakes Bay Oyster Company on November 14, regarding Removal of Kumamoto oysters from Home Bay, Drakes Estero.

“On October 14, 2008, California Department of Fish and Game (DFG) staff oversaw the removal of Kumamoto oysters from Home Bay, Drakes Estero. DFG staff included myself and Tom Moore, Marine Aquaculture Coordinator. The oysters were contained in ~1 M² plastic mesh growout bags laying on the mud flat Drakes Bay Oyster Company (DBOC) stall located the bags containing Kumamoto oysters on Bed 39 at Home Bay. DBOC and DFG staff searched for and removed all bags of Kumamoto oysters present. The bags were confined to a region approximately 10M in diameter. We removed exactly 20 bags, each with approximately 300 oysters per bag. The bags were transported by boat to the DBOC headquarters where they were transferred to land. All oysters were disposed of on land.”

xi. CFGC 1993, Minutes from the October 7, 1993, meeting for the amendment to Lease No. M-438-02, regarding addition of Manila clams (*Tapes japonica*) to the list of species for mariculture purposes.

Department Recommendation

"Lease M-438-02 is a small, one-acre lease which has been previously used by Johnson Oyster Company in the experimental culture of species other than oysters. Johnson Oyster Company would now like to investigate if conditions in Drakes Estero are suitable for the culture of Manila clams.

"The Department does not have any concerns about this request and recommends approval."

xii. NPS 2009e, Letter from Point Reyes National Seashore Superintendent, to Drakes Bay Oyster Company, December 22, 2009, regarding cultivation of Manila clams, site development request, and additional information on Manila clams.

“At this time, we would like to request additional information on Manila clam production. Please provide a proposal that includes location and size of growing area, approximate number of bags and clams, seed origin, history of production, and other details on the production of Manila clams. With this information we will use our standard process to meet our environmental compliance responsibilities.”

xiii. DBOC 2009c, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on December 29, 2009, regarding clerical error correction and Manila clam cultivation in CDFG Lease M-438-01.

“As the cultivation of clams on lease M-438-0 1 has been authorized since 1993, no further approvals from NPS to cultivate clams are necessary. Please direct any questions you may have about this to the FGC.”

xiv. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (Section 3.2.10 of Consent Order)— Maximum annual production limit.

“Based on the planting records, it is expected that the total shellfish harvest from Drakes Estero be around 770,000 Lbs. If all environmental conditions are conducive, and mortality rates are low, as much as 850,000 Lbs could be harvested in a single year, based on the recent years’ plantings. For the purposes of this consent order, the production limit should be set at ‘approximately 850,000 Lbs’ as ‘current production’.”

xv. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster rack GPS data. This attachment is a spreadsheet listing rack condition, length, and GPS location.

xvi. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster rack GPS data. This attachment is a spreadsheet listing rack condition, length, and GPS location.

xvii. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding maps of racks (oyster rack GPS information). This attachment is a spreadsheet listing rack condition, length, and GPS location.

xviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“Roughly half of the DBOC production originates on racks and is finished in bags on the bottom. The other half begins in floating bags and is finished in bags on the bottom.”

xix. NPS 2005, Email from Point Reyes National Seashore Superintendent to Kevin Lunny on August 17, 2005, regarding Oyster Farm.

“We approved the use of the treated lumber with ACZA for repairs to existing racks.”

xx. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC continued to make significant rack repairs from 2005-2007, until the CCC---working closely with the NPS---abruptly prohibited DBOC from making any rack repairs.”

xxi. DBOC 2009d, Letter from Drakes Bay Oyster Company to California Coastal Commission on October 2, 2009, regarding Consent Cease & Desist Order No. CCC-07-CD-11 Enforcement letter dated September 16, 2009.

“DBOC has not repaired any oyster racks since the Consent CDO was agreed upon. As agreed in the order, DBOC will not make any repairs to the oyster racks until a CDP has been obtained and the NPS, CDFG and CCC have approved all repair materials. DBOC will provide complete material submittals to each of these agencies, and receive approval, prior to use.”

xxii. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster rack GPS data. This attachment is a spreadsheet listing rack condition, length, and GPS location.

xxiii. DBOC 2010f, Letter from Drakes Bay Oyster Company to California Coastal Commission on March 16, 2010, regarding Coastal Development Permit Application No: 2-06-003—response to CCC letter dated March 9, 2010.

“French tubes replace the Japanese hanging cultch method and can be used on all racks.”

xxiv. DBOC 2010a, Attachment 10a to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production/rack culture/cluster oysters. “Practice Protocols – Japanese Hanging Cultch Method,” including list of items associated with this type of culture.

xxv. DBOC 2010a, Attachment 10a to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production/rack culture/cluster oysters. “Practice Protocols – French Tube (oyster stick) Culture,” including list of items associated with this type of culture.

“Tubes are hung on racks for approximately 12 months.”

xxvi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The time the oysters are kept on the beaches varies – up to about 9 months, turned about every month or two. ... Only about 2 months of beach hardening is necessary, but because of current limited rack space, oysters are removed much sooner to allow for new seed.”

xxvii. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production (oyster production bottom bags). Diagrams of bottom bags were shown on this attachment.

“In high-flow, more aggressive current areas, bottom bags are attached to long lines (refer to diagrams and specifications 1 and 2, below).”

xxviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors.”

xxix. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production/bottom bags. Diagrams of bottom bags were shown on this attachment.

“In low current flow areas, where there is no risk of bag displacement, single bags are placed directly on the substrate, without the use of long lines.”

xxx. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production (oyster production bottom bags).

“Floating bottom bag culture (see diagrams and specifications 2 & 3, below), typically used for smaller seed, can rest on the substrate at low tide and float off the bottom at high tide.”

xxxi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors."

xxxii. DBOC 2010d, Attachment 10d to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding oyster production (harvest area). This attachment contains a list of harvest areas (otherwise referred to in the document as culture beds) and the type of culture that takes place in each bed.

xxxiii. DBOC 2012d, Letter (with attachment) from Drakes Bay Oyster Company to the California Coastal Commission on February 27, regarding CCC Letters regarding marine debris.

"The spacers, and then, the coffee can lids, continued to be lost during storm events. Due to the extensive loss of plastic into the environment, CDFG required JOC to stop stake culture in Drakes Estero. By the mid 1990s all stake culture had ceased and had been replaced by bag culture."

xxxiv. DBOC 2008e, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 30, regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.7 of Consent Order)—Pacific Oysters and European Flat Oysters.

"Only the traditional Japanese Hanging Culture, Rack and Bag Culture, Bottom Bag Culture, Floating Bag Culture (seed rearing) and Floating Tray Culture (seed rearing) are currently used in Drakes Estero. Drakes Bay Oyster Company has introduced no new shellfish culturing methods. New culturing methods will not be used in Drakes Estero without prior approval from the California Department of Fish and Game, the California Fish and Game Commission and the California Coastal Commission."

xxxv. DBOC 2012d, Letter (with attachment) from Drakes Bay Oyster Company to the California Coastal Commission on February 27, regarding CCC Letters regarding marine debris.

"They gloss over the persistence of coffee can lids used by the previous operator, JOC, to stabilize stake culture (see appendix). ... As these coffee can lids have not been used in Drakes Estero by JOC for nearly 20 years, this further demonstrates that the plastic marine debris can, and has persisted for a long period of time in Drakes Estero."

xxxvi. DBOC 2011f, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 4, 2011, regarding supplemental scoping information.

"The photos show 'cubes' of 'French tubes,' also known as 'oyster sticks.' This was a step once used by DBOC in the French tube oyster culture. In the past, DBOC set larvae on the tubes in the outdoor setting tanks and then let the microscopic spat begin to grow on the tubes in the cubes on Bed 7 for a few weeks before hanging the tubes on the racks. DBOC has found this step to be unnecessary, and therefore this step is no longer used. Currently, DBOC brings the tubes directly to the racks following the setting process."

xxxvii. DBOC 2010c, Attachment 10c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding oyster production (November 2007 map). This attachment contains a map of each harvest area.

xxxviii. DBOC 2010e, Attachment 12c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster rack GPS data. This attachment contains a table of GPS data points and measurements of the DBOC racks in Drakes Estero.

xxxix CCC 2011, Letter from California Coastal Commission to Drakes Bay Oyster Company on September 29, 2011, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

“The issue has been raised to the Commission that there is a substantial amount of marine debris in Drakes Estero and on Point Reyes beaches, and that a large portion of this marine debris comprises plastic spacers and other materials used in Drakes Bay Oyster Company's (DBOC) aquaculture operation. ... It is not clear to Commission staff at this time what aspect of the DBOC operation is apparently resulting in the release of plastic marine debris. If the marine debris now being found in and near Drakes Estero is coming from abandoned areas or equipment that has not been addressed consistent with the Debris Removal Plan and Order, we would welcome a discussion with you about updating or modifying the Debris Removal Plan to address this issue. If, however, the plastic debris is being released due to improper storage of active-use (non-abandoned) aquaculture equipment at the DBOC facility or some other operational oversight, the dispersion of these new materials throughout the Point Reyes coastal area would constitute new unpermitted development and may require a different set of solutions. In either case, as I'm sure you will agree, the continued presence and release of plastic marine debris poses a hazard to the marine environmental and natural resources of Drakes Estero and needs to be aggressively and comprehensively addressed in the immediate future.”

xl. CCC 2012a, Letter from California Coastal Commission to Drakes Bay Oyster Company on February 1, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

“Marine debris, especially plastics, and the use of motorized vessels near sensitive harbor seal areas pose serious threats to marine habitats and wildlife, and we are therefore concerned about these issues at Drakes Estero.”

xli. CCC 2012b, Letter from California Coastal Commission to Drakes Bay Oyster Company on July 30, 2012, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

“Marine debris, especially plastics, poses a serious threat to marine habitats and wildlife. Commission staff has been informed that there is a substantial amount of marine debris in Drakes Estero and on Point Reyes beaches, and that a large portion of the debris consists of materials used in aquaculture operations, such as plastic spacers, small-mesh bags, and polystyrene flotation blocks. Sections 3.2.2 and 3.2.3 of the Order require removal of abandoned equipment, and the reported presence of marine debris is suggestive of possible violations of these Sections, as well as a general problem that should be addressed to avoid such threats to marine habitats and wildlife. In addition, Section 3.2 .3 of the Order required submission of a Debris Removal Plan.”

xlii. DBOC 2012d, Letter (with attachment) from Drakes Bay Oyster Company to the California Coastal Commission on February 27, 2012, regarding CCC Letters regarding marine debris.

“DBOC has agreed to re-write section 3.2.3 of the consent order to include a marine debris removal recordkeeping component.”

xliii. DBOC 2011i, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011, regarding Drakes Bay Oyster Company's comments on National Park Service Draft Environmental Impact Statement for Special Use Permit

“In 2005, DBOC took over the shellfish farm in Drakes Estero. Fully aware of the legacy plastic debris problems, DBOC made several changes in farm practices to further reduce the chances of losing culture gear into the environment, including:

1. Immediately implementing a policy that no wires would be cut when harvesting strings from the racks until above the high tide line (above the stringing shed). DBOC removes the oysters from the wires without cutting the wire. Using this technique, the black plastic spacers are not subject to loss into the environment.

2. Beginning in 2006, DBOC began to replace the Japanese Hanging Cultch wire string culture method with "French tubes". These French tubes reduce consumables (i.e., the wire strings which can only be used for one growing season), and do not require the black spacers. It should be noted that DBOC, EAC, or NPCA have never found a fugitive French tube anywhere in Drakes Estero. Over the past five years, approximately 100,000 strings have been replaced with the French tube method, and this technique now represents the majority of the rack culture. DBOC will, however, continue to cultivate a portion of its oysters with the traditional wire string and spacer method. The description of this historic culture method during DBOC's interpretive on-farm tours is of great interest to the visiting public.

3. DBOC checks the oyster racks regularly to remove any loose materials so they are not lost into the environment.

4. DBOC anchors all oyster bags in areas where there is potential for tidal energy to displace bags.

5. DBOC initiated a program whereby all floating culture is anchored in a least two places and all floating bags are attached to at least two anchored lines (a DBOC "redundancy program")."

xliv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service's April 2012 questions.

"The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero. ... DBOC began with three boats in operation at one time, then reduced to two boats, and currently uses three boats again. Albeit unusual, all boats can be in the Estero all day. Sometimes, boat use is required 7 days a week. On other days, no boats enter the estero at all. As a working farm, DBOC must work around tides, weather, day length, planting season, high demand occasions, etc. The oyster farm has always operated with these variable demands and will continue to in the future."

xliv. DBOC 2011f, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 4, 2011, regarding supplemental scoping information.

"Currently, there are no permanent moorings in Drakes Estero. Each barge has its own anchor for occasional use. DBOC rules are to anchor barges in deep water."

xlvi. DBOC 2008f, Letter from Drakes Bay Oyster Company to California Coastal Commission on February 11, regarding CCC-07-CD-04 Drakes Bay Oyster Company—Boat Transit.

"As it is required for Drakes Bay Oyster Company to access Drakes Estero during low tides, regular boat traffic will be limited to the routes identified on attached map during low tides while eelgrass is present in Drakes Estero. These routes are necessary for the required minimum access to accomplish water quality and marine biotoxin monitoring for Drakes Estero. Individual growing areas will not be accessed during low tide unless it is necessary for planting, managing or harvesting."

xlvii. DBOC 2010o, Attachment 1a to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding boat transit map. This attachment is a PDF map with a broad-scale hand-drawn map of boat routes in Drakes Estero.

xlviii. DBOC 2010s, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Natural Resource Manager on November 15, 2010, regarding vessel transit plan.

“As it is required for Drakes Bay Oyster Company to access Drakes Estero during low tides, regular boat traffic will be limited to the routes identified on attached map during low tides while eelgrass is present in Drakes Estero. These routes are necessary for the required minimum access to accomplish water quality and marine biotoxin monitoring for Drakes Estero. Individual growing areas will not be accessed during low tide unless it is necessary for planting, managing or harvesting.”

xlix. DBOC 2012e, Letter from Drakes Bay Oyster Company to the California Coastal Commission on March 5, 2012, regarding March 5, 2012 Meeting.

“We then explained to you that oyster boats have operated in the western end of the lateral channel during pupping season since the seal protection protocols were established in 1992 by NPS, NOAA, CDFG, CDPH and Johnson Oyster Company (including the years following the 2008 NPS special use permit).”

I. CCC 2012a, Letter from California Coastal Commission to Drakes Bay Oyster Company on February 1, 2012, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

Concerning the issue of motorized vessels in the lateral' channel during the restricted period, at our January 4 meeting, your attorney, Mr. Walton, argued that the language of the SUP stating that "the 'Main Channel' and 'Lateral Channel' of Drakes Estero will be closed to boat traffic" during certain periods actually meant that only the intersection of those channels would be so closed. We pointed out that this interpretation is at odds with the plain language of the prohibition. In support of your interpretation, Mr. Walton argued that the 1992 protocol only prohibited passage through that intersection and that it was not superseded by the SUP, so it is still binding. In fact, he argued that the SUP was intended to extend the prohibitions contained in the 1992 protocol. However, nothing in the SUP so indicates. To the contrary, the SUP contains an integration clause (provision 32 on page 14) that states that the SUP itself, with its exhibits, "constitutes the entire agreement between Permittee and Permittee with respect to the subject matter of this Permit and supersedes all prior offers, negotiations, oral and written." Thus, the SUP clearly did supersede the 1992 protocol, and Mr. Walton's claim that you were abiding by the terms of the 1992 protocol and that there have always been motorized boats in the lateral channel year-round is not only irrelevant to whether this is a violation of the SUP and the Consent Order, but an admission of a longer violation. We have discussed this matter with the National Park Service (NPS), and NPS has confirmed that a) they agree with our reading of the SUP (i.e., boat traffic is indeed prohibited in the entire lateral channel between March 1 and June 30); and b) the 1992 protocol has been superseded by the SUP and was in no way memorialized or authorized as part of the SUP.

ii. NPS 2012a, Letter from Point Reyes National Seashore Superintendent to Drakes Bay Oyster Company on January 23, 2012, regarding L7917 (Special Use Permit – MISC-8530-6000-8002).

“The plain meaning of this provision is that the entirety of the Lateral Channel is closed during the harbor seal breeding season (March 1-June 30). The SUP references the Lateral Channel, Main Channel and West Channel. The Lateral Channel is the entire channel between the Main Channel and West Channel. The eastern portion of the Lateral Channel is within the permanent harbor seal protection area and is thus closed to boat use all year. The west portion of the Lateral Channel (outside of the harbor seal protection area) is subject to the seasonal closure (March 1-June 30).

During the negotiations for the current SUP, DBOC introduced a 1992 protocol for consideration, but it was not incorporated into the final signed SUP. As explained above, Section 4(b)(vii) and

Exhibit C are the operative provisions of the SUP specific to harbor seals. Boat use of any portion of the Lateral Channel during the seasonal closure period is not allowed under the SUP.”

lii. NPS 2012a, Letter from Point Reyes National Seashore Superintendent to Drakes Bay Oyster Company on January 23, 2012, regarding L7917 (Special Use Permit – MISC-8530-6000-8002).

“The plain meaning of this provision is that the entirety of the Lateral Channel is closed during the harbor seal breeding season (March 1-June 30). The SUP references the Lateral Channel, Main Channel and West Channel. The Lateral Channel is the entire channel between the Main Channel and West Channel. The eastern portion of the Lateral Channel is within the permanent harbor seal protection area and is thus closed to boat use all year. The west portion of the Lateral Channel (outside of the harbor seal protection area) is subject to the seasonal closure (March 1-June 30).

During the negotiations for the current SUP, DBOC introduced a 1992 protocol for consideration, but it was not incorporated into the final signed SUP. As explained above, Section 4(b)(vii) and Exhibit C are the operative provisions of the SUP specific to harbor seals. Boat use of any portion of the Lateral Channel during the seasonal closure period is not allowed under the SUP.”

liii. CCC 2012a, Letter from California Coastal Commission to Drakes Bay Oyster Company on February 1, 2012, regarding Compliance with the Coastal Act and with Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company).

Operation of boat traffic in the lateral channel year-round, therefore, is inconsistent with, first, the 1992 protocol, and, later, the April 22, 2008 NPS Special Use Permit (SUP) issued to Drakes Bay Oyster Company (DBOC), which superseded this protocol, and is therefore a violation of the Consent Order reached between you and the Commission. As provided for in the Order (including sections 5.0, 6.0, and 7.0), and as discussed in our meeting of January 4, 2012, the Order incorporates by reference the requirements of other legal requirements, and includes a commitment by DBOC to comply with all applicable laws and regulations, and permits issued to DBOC, specifically including the SUP.

liv. NPS 2010h, Letter from Point Reyes National Seashore Chief of Natural Resource Management to Drakes Bay Oyster Company on October 6, 2010, regarding Information request.

1. Vessel Transit Plan , with list, description of vessels used and frequency

lv. DBOC 2010p, Attachment 1b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding GPS tracking data from June 7, 2010. This attachment contained a PDF map at a broad scale of GPS boat tracking data from June 7, 2010.

lvi. DBOC 2010q, Attachment 1c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding GPS tracking data from January 18, 2010. This attachment contained a PDF map at a broad scale of GPS boat tracking data from January 18, 2010.

lvii. NPS 2011p, Email from Point Reyes National Seashore Hydrologist to Drakes Bay Oyster Company on February 25, regarding Follow up on Feb 16 Meeting.

The following are a list of items that were requested by VHB during their visit.

...

5. All GPS boat transit data, as specific as possible (mentioned weekly GPS data downloads and potential GPS data for routes organized by rack/bed number)

Iviii. DBOC 2011f, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore Natural Resource Manager on March 4, 2011, regarding supplemental scoping information

“DBOC did not plan to make the GPS records available to the public or the NPS unless it was necessary to prove the whereabouts of a DBOC boat. These data were not designed for any other use. DBOC has already provided you with maps showing GPS tracks of boat usage in Drakes Estero on November 15th, 2010 (Attachments 1b and 1c). How is more detailed GPS data to be used by the EIS process? If DBOC is to submit private, detailed GPS records, the records must be treated securely by VHB. DBOC is concerned about the safety of the data due to the fact that certain PRNS staff--directly involved with the challenged allegations of harm to harbor seals, reports, and other public claims of environmental harm caused by DBOC--is involved in this EIS process.”

Ixi. DBOC 2010p, Attachment 1b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding GPS tracking data from June 7, 2010. This attachment contained a PDF map at a broad scale of GPS boat tracking data from June 7, 2010.

Ix. DBOC 2010q, Attachment 1c to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding GPS tracking data from January 18, 2010. This attachment contained a PDF map at a broad scale of GPS boat tracking data from January 18, 2010.

Ixi. DBOC 2010p, Attachment 1b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding GPS tracking data from June 7, 2010. This attachment contained a PDF map at a broad scale of GPS boat tracking data from June 7, 2010.

Ixii. NPS 2012a, Letter from Point Reyes National Seashore Superintendent to Drakes Bay Oyster Company on January 23, regarding L7917 (Special Use Permit – MISC-8530-6000-8002).

“The SUP references the Lateral Channel, Main Channel and West Channel. The Lateral Channel is the entire channel between the Main Channel and West Channel.”

Ixiii. NPS 1992, Letter from Point Reyes National Seashore to California Department of Fish and Game on April 28.

Attachment includes a graphic showing the area defined as the lateral channel.

Ixiv. NPS 2005, Email from Point Reyes National Seashore Superintendent to Kevin Lunny on August 17, regarding Oyster Farm.

“As you recall, the NPS does not have an issue with the temporary structures except that the State of California Food and Agriculture Branch must approve the potential use of these facilities and the septic issues must be resolved with Marin County.”

Ixv. DBOC 2011b, Letter from Drakes Bay Oyster Company to permitting agencies on March 25, 2011 regarding Emergency Repair Permit Applications for Damages Caused by the March 19 & 20, 2011 Wind Storm.

“South Pier: Remove and properly dispose of remaining portions of the pier. DBOC does not plan to replace the South Pier.”

Ixvi. DBOC 2009b, Letter from Drakes Bay Oyster Company to California Coastal Commission on October 5, 2009 regarding Coastal Development Permit Application No: 2-06-003—Additional documentation in response to request by California Coastal Commission in letter dated June 10, 2009.

“42. Replace existing 12' X 60' floating dock at the end of the oyster washing dock.

49. Installation of one 8-foot by 40-foot storage container.

54. Installation of a temporary 8-foot by 40-foot container for oyster shucking and packing.”

Ixvii. CCC 2006, Letter from California Coastal Commission to Drakes Bay Oyster Company on March 21, regarding Ongoing violation of Cease and Desist Order No. CCC-03-CD-12 and violation of the Coastal Act; deadline for completion of CDP Application No. 2-06-003.

“Staff also observed five partially buried and plumbed oyster culture tanks located in the area labeled "M: Seed setting area" on the 2004 building location exhibit. These tanks were not present in this location during staff's March 15, 2005 site visit (see attached photo), and were presumably removed as required under the Order when all of the Area M buildings and their contents were removed. During last month's site visit, you stated that you simply put the tanks back near where they used to be inside the buildings that were removed. The removal requirements of the Order, however, include not just the buildings that were slated for removal, but their contents as well. The relocation, partial burial, and plumbing of these tanks in this location therefore constitute new unpermitted development and are in violation of the Order's removal requirements.”

Ixviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

“DBOC does not add nutrients during the setting process and does not plan to. DBOC does occasionally add microalgae to the water used inside the single oyster setting system during times that DBOC is recirculating water. The algae provide some food for the juvenile oysters (attachment 3.h.1)”

Attachment 3.h.1 shows a sample label of the label of Instant Algae® Marine Microalgae Concentrates Shellfish Diet 1800™.

Ixix. DBOC 2010f, Letter from Drakes Bay Oyster Company to California Coastal Commission on March 16, 2010, regarding Coastal Development Permit Application No: 2-06-003 – Response to CCC letter dated March 9, 2010.

“4. Two of the five setting tanks are 10' in diameter and 4' deep and three of the tanks at 7' in diameter and 4' deep.

5. One of the pumps is always running to provide water to the hatchery and setting systems. During nonworking hours, the one horsepower pump provides enough flow. While employees are washing oysters, the five horsepower pump provides enough flow for the hatchery and the washing. The pumps never operate simultaneously. They are actually wired and controlled so that only one pump can operate at any one time.

6. The outdoor setting tanks are filled and remain full for about 4 days during the setting period. After 4 days, to feed the juvenile oysters and cool the water slowly, raw seawater flows through tanks at about 5 GPM for the next 3 days.”

Ixx. DBOC 2011i, Correspondence ID 52043, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, regarding Drakes Bay Oyster Company's comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

The Executive Summary Comments and Suggested Revisions included in this correspondence state: “This exhibit (as well as others) does not include the existing wet storage facility. Currently, DBOC has an above ground concrete structure, plumbing and underground tank that is omitted from the NPD exhibit in the DEIS. This existing system is vital to the operations of the oyster farm. The wet storage facility should be shown on the site drawings and allowed to continue. Restricting the use of this facility would be detrimental to DBOC.”

Ixxi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Also attached are photos of the 5' wide x 48' concrete slab (3.a.2, 3.a.3), the associated plumbing (3.a.4) and an example of one of the live holding tanks used by DBOC (3.a.5)."

Ixxii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Approximately 25% of DBOC product is sold in jars and 75% is sold live in the shell."

Ixxiii. DBOC 2011b, Letter from Drakes Bay Oyster Company to permitting agencies on March 25, regarding Emergency Repair Permit Applications for Damages Caused by the March 19 & 20, 2011 Wind Storm.

- Floating Dock: Remove and dispose of final portions of the destroyed 12' x 60' dock, Replace floating dock with dock of similar materials and exact dimensions, The new floating dock will be anchored to the end of the new work platform, Because the new dock will be anchored to the new platform, no new pilings will be necessary to replace pilings lost during the wind storm.
- Work Platform: As the existing wood platform is damaged beyond repair, a total replacement is required.

Ixxiv. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"47. Replacement of six picnic tables and six additional picnic tables"

Ixxv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Approximately 40% of DBOC income is from onsite retail sales, 40% is sold directly to local market and restaurants – all delivered by DBOC directly, 18% is sold to Tomales Bay shellfish growers, and 2% is sold through a wholesale seafood distributor based in San Francisco."

Ixxvi. NPS 2006e, Letter from Point Reyes National Seashore Superintendent to Kevin Lunny on February 23, 2006.

"The major paving project in front of the planned future retail area, pathway, and fencing were all improvements made since our last visit that were not authorized by the Park Service."

Ixxvii. CCC 2006, Letter from California Coastal Commission to Drakes Bay Oyster Company on March 21, regarding Ongoing violation of Cease and Desist Order No. CCC-03-CD-12 and violation of the Coastal Act; deadline for completion of CDP Application No. 2-06-003.

"Staff visited the property on February 17, 2006, at which time staff observed this unpermitted development as well as other new unpermitted development including fencing and a wedge of fill topped with freshly paved asphalt located between the two unpermitted storage containers and the retail building."

Ixxviii. DBOC 2010k, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding housing.

"DBOC provides five homes with a total of 14 bedrooms for its employees; and in some cases, their families."

Ixxix. CDFG 2011b, Email from Associate Marine Biologist, California Department of Fish and Game Aquaculture and Bay Management Project, to Point Reyes National Seashore, on May 26, 2011, regarding Escrow account for DBOC.

“Turns out the account was never transferred to DBOC when the lease was transferred. The bank indicated that they spoke to the Johnson’s about the necessary documentation needed to transfer the account to DBOC, but it was never followed through. ... I will work with DBOC to establish a new agreement and discuss what the estimated clean-up costs are currently and how much should be set-aside in the escrow account.”

Ixxx. CDFG 2007b, Letter from Director, California Department of Fish and Game to Superintendent Point Reyes National Seashore, May 15, 2007, regarding Drakes Bay Oyster Company lease status.

“Consistent with article 1, section 25 of the California Constitution, this conveyance carried a reservation of the right to fish in the waters overlying these lands. Although the right to fish extends to both commercial and sports fishing, it does not extend to aquaculture operations. Regardless if its purpose is commercial or recreational, *fishing* involves the take of public trust resources and is therefore distinct from aquaculture, which is an agricultural activity involving the cultivation and harvest of private property.”

Ixxxi. DOI 2012a, Letter (with attachments) from Field Solicitor to California Fish and Game Commission Executive Director on May 21, 2012.

“The issue of the State of California’s authority to issue aquaculture leases for the water bottoms in Drakes Estero has been addressed by the Department of Fish and Game’s Office of General Counsel, by the Executive Officer of the State Lands Commission, and by the Attorney General’s Office. All three have reached the same conclusion: that the “right to fish” under the public trust doctrine does not extend to aquaculture or to the leasing of water bottoms in Drakes Estero.”

Ixxxii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC does not grow European flat oysters and does not plan to grow this species in the future.”

Ixxxiii. DBOC 2008a, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 30, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.6 of Consent Order).

“Section 3.2.6 - HARBOR SEAL PROTECTION AREAS. The Consent Cease and Desist Order temporarily limits the use of growing areas to that which was actively growing oysters when the California Department of Public Health staff, using a GPS, identified those areas except Bed 17. Bed 17 is shown in its entirety rather than only the actively used portion. See Exhibit 7a for individual bed locations. As you will see in exhibit 7b the 2007 -2008 Annual Sanitary Survey. The Approved Area Bed 17 is shown in white. This depicts the entire 25.46 acres of fully approved shellfish growing waters. The Consent Order Seal Protection Area bisected this Approved Area Bed 17. No oysters were being grown prior to the Consent Order or are being grown in the portion of Bed 17 that now falls within the Seal Protection Area. Therefore, no oysters either need or needed to be removed. In reference to oysters being grown in Approved Area Bed 17, outside of the Seal Protection Area; we utilize the entire area as shown.”

Ixxxiv. DBOC 2011e, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 15, 2011, regarding Lease M-438-01 lease line.

“The area to be removed is the area nearest the main channel where harbor seals haul out. The edge of the lease, therefore, will be more than 500’ away from the main channel haul outs. This distance exceeds the minimum setbacks of both the Marine Mammal Act and the more restrictive

1992 multi-agency Drakes Estero Harbor Seal Protection Protocols. Lastly, these new setbacks will alleviate the need for the temporary seal protection areas which were added as a precautionary measure by the California Coastal Commission.”

Ixxxv. DBOC 2008e, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 30, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (section 3.2.7 of Consent Order)—Pacific Oysters and European Flat Oysters.

“No oyster species other than the Pacific oyster and the European Flat oyster will be planted in Drakes Estero by the Drakes Bay Oyster Company without prior approval from the California Department of Fish and Game, the California Fish and Game Commission and the California Coastal Commission.”

Ixxxvi. DBOC 2012a, Letter from Drakes Bay Oyster Company (with attachments) to the California Coastal Commission on February 17, 2012, regarding CDP Application Number 2-06-003.

“18. Continue Pacific and European oyster culture using hanging cluster method, both on “strings” and on “French Tubes” on racks located throughout DFG lease area number M-438-01 within Drakes Estero.

19. Continue Pacific and European oyster culture using anchored bottom bags within intertidal areas throughout DFG lease area number M-438-01 within Drakes Estero

20. Continue Pacific and European oyster culture using un-anchored bottom bags within intertidal areas throughout DFG lease area number M-438-01 within Drakes Estero

21. Continue Pacific and European oyster culture using anchored floating bags within intertidal areas throughout Department of Fish and Game lease area number M-438-01 within Drakes Estero”

Ixxxvii. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, 2012, regarding Coastal Development Permit Application No: 2-06-003.

“12. Continue Pacific and European oyster culture using hanging cluster method, both on “strings” and on “French Tubes” on racks located throughout DFG lease area number M-438-01 within Drakes Estero.

13. Continue Pacific and European oyster culture using anchored bottom bags within intertidal areas throughout DFG lease area number M-438-01 within Drakes Estero

14. Continue Pacific and European oyster culture using un-anchored bottom bags within intertidal areas throughout DFG lease area number M-438-01 within Drakes Estero

15. Continue Pacific and European oyster culture using anchored floating bags within intertidal areas throughout Department of Fish and Game lease area number M-438-01 within Drakes Estero”

Ixxxviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC does not grow European flat oysters and does not plan to grow this species in the future.”

lxxxix. DBOC 2012d, Letter (with attachment) from Drakes Bay Oyster Company to the California Coastal Commission on February 27, regarding CCC Letters regarding marine debris.

“They gloss over the persistence of coffee can lids used by the previous operator, JOC, to stabilize stake culture (see appendix). ... As these coffee can lids have not been used in Drakes Estero by JOC for nearly 20 years, this further demonstrates that the plastic marine debris can, and has persisted for a long period of time in Drakes Estero.”

xc. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following.”

xc. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following.”

xcii. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production (oyster production bottom bags). Diagrams of bottom bags were shown on this attachment.

“In high-flow, more aggressive current areas, bottom bags are attached to long lines (refer to diagrams and specifications 1 and 2, below).”

xciii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors.”

xciv. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production/bottom bags. Diagrams of bottom bags were shown on this attachment.

“In low current flow areas, where there is no risk of bag displacement, single bags are placed directly on the substrate, without the use of long lines.”

xcv. DBOC 2010b, Attachment 10b to the letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding oyster production (oyster production bottom bags).

“Floating bottom bag culture (see diagrams and specifications 2 & 3, below), typically used for smaller seed, can rest on the substrate at low tide and float off the bottom at high tide.”

xcvi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors.”

xcvii. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

“Purple hinged rock scallops have traditionally been raised in Drakes Estero using floating racks, floating trays and lantern nets. DBOC plans to continue to culture these native scallops using similar techniques.”

xcviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero.”

xcix. DBOC 2011d, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, 2011, regarding boat parking and floating dock area dredging.

“The area of shell debris removal is approximately 60’ x 30’. The depth of the dredging in this area will vary from 0’0” to approximately 3’0” near the pier. The approximate total volume of dredged material is approximately 100 cubic yards.”

c. DBOC 2011a, Letter from Drakes Bay Oyster Company to permitting agencies on April 4, 2011, regarding Drakes Bay Oyster Farm Emergency Repair Project Description. This packet of information distributed among agencies, including the NPS (specific agencies are unspecified), describes DBOC’s proposal for site repairs required following March 2011 high wind event damage.

ci. DBOC 2011b, Letter from Drakes Bay Oyster Company to permitting agencies on March 25, 2011, regarding Emergency Repair Permit Applications for Damages Caused by the March 19 & 20, 2011 Wind Storm. This packet of information distributed among agencies, including the NPS (specific agencies are unspecified), describes DBOC’s proposal for site repairs required following March 2011 high wind event damage.

cii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“As explained in the July 6, 2010 letter requesting the SUP, the CDFG has been leasing the bottomlands in Drakes Estero for shellfish cultivation since the early 1930’s. As required by the California Constitution, the California Legislature retained fishing rights in the tidelands, as well as mineral rights, when it otherwise transferred ownership of the tidelands to the United States in 1965. The State’s right to issue leases for shellfish cultivation in these waters is a property right long managed through leases authorized by the State Legislature and the California Fish and Game Commission. In 2004, DBOC’s two leases were renewed for 25 years, through 2029. Therefore, DBOC is not seeking a permit from the NPS to cultivate oysters in Drakes Estero. Instead, DBOC is seeking a SUP consistent with the terms found in Article 11 of the RUO, which states: ‘Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property for the herein described purposes, provided however, that such permit will run concurrently with and will terminate upon the expiration of the state water bottom allotments assigned to the vendor. Any permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires.’”

ciii. DBOC 2011e, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 15, 2011, regarding Lease M-438-01 lease line. Attachments to this letter show the revised lease boundaries proposed by DBOC.

civ. DBOC 2010g, Letter from Drakes Bay Oyster Company to California Department of Fish and Game on April 27, 2010, regarding Lease M-428-01.

“Drakes Bay Oyster Company (DBOC) requests that the following native species be added to the list of approved species for cultivation on lease No. M-438-01:

1. Olympia oyster (*Ostrea conchaphila*) Olympia oysters are indigenous to Drakes Estero and currently exist in Drakes Estero.
2. Purple Hinged Rock Scallops (*Hinnites multirugosus*). Purple Hinged Rock Scallops are indigenous to Drakes Estero and currently exist in Drakes Estero. Purple Hinged Rock Scallops are already an approved cultured species in Drakes Estero on lease No. M-438-02 which is located within M-438-01.

Currently, Pacific oysters (*C. gigas*), European Flat oysters (*Ostrea edulis*) and Manila clams (*Venerupis phippinarum*) are approved for cultivation on M-438-01. The net effect of this request will be to add two native species of bivalve shellfish to lease M-438-01.”

And letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 4, 2011, regarding new cultured species request. “On January 26, 2011 Point Reyes National Seashore requested additional scoping information about the native Olympia oysters and the native Purple Hinged Rock Scallops. DBOC has been given a deadline of March 4, 2011 to provide all additional scoping information. This letter will provide additional information regarding native shellfish culture in Drakes Estero.”

cv. DBOC 2011c, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Scientist on March 4, 2011, regarding new cultured species request.

“DBOC has hoped to add native species to its State water bottom lease for several years. There are a number of reasons that have contributed to our desire to add these natives.” This letter goes on to give detailed background on Olympia oysters and purple-hinged rock scallops.

cvi. DBOC 2010g, Letter from Drakes Bay Oyster Company to California Department of Fish and Game on April 27, 2010, regarding Lease M-428-01.

“Drakes Bay Oyster Company (DBOC) requests that the following native species be added to the list of approved species for cultivation on lease No. M-438-01:

1. Olympia oyster (*Ostrea conchaphila*) Olympia oysters are indigenous to Drakes Estero and currently exist in Drakes Estero.
2. Purple Hinged Rock Scallops (*Hinnites multirugosus*). Purple Hinged Rock Scallops are indigenous to Drakes Estero and currently exist in Drakes Estero. Purple Hinged Rock Scallops are already an approved cultured species in Drakes Estero on lease No. M-438-02 which is located within M-438-01. Currently, Pacific oysters (*C. gigas*), European Flat oysters (*Ostrea edulis*) and Manila clams (*Venerupis phippinarum*) are approved for cultivation on M-438-01. The net effect of this request will be to add two native species of bivalve shellfish to lease M-438-01. No new culture methods will be required to grow these additional shellfish species and all seed stock will be certified by CDFG before planting.”

cvii. DBOC 2011c, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 4, 2011, regarding new cultured species request.

“Similar to the native oysters, DBOC has been planning for years to re-establish the native scallop production in Drakes Estero. DBOC has been studying this species and recognizes the challenges in producing scallop seed and rearing scallops. Hatchery techniques are less established for scallops than

they are for oysters. Currently, DBOC is working with Sea Grant on a Purple Hinged Rock Scallop hatchery techniques grant (attachment g). This grant proposal is in draft form and is confidential. If approved, DBOC plans to participate in this three to four year project that will ultimately provide the necessary training for DBOC staff to perform all hatchery operations on-farm. This species takes approximately four years to reach market size (approximately 1 pound). This is a long term project that will require significant research, training and investment. DBOC is looking forward to getting started.”

cviii. DBOC 2008b, Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008, regarding CCC-07-CD-04 Drakes Bay Oyster Company (Section 3.2.10 of Consent Order).

“If all environmental conditions are conducive, and mortality rates are low, as much as 850,000 Lbs could be harvested in a single year, based on the recent years’ plantings. “

cix. DBOC 2011e, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Resource Manager March 15, 2011, regarding Lease No. M-438-01 lease line adjustment. Attachment contained a map displaying proposed revisions overlaid on existing boundaries.

cx. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“NPS also asked if boat use may change with differing levels of production. DBOC has answered this question before. Other credible, competent, experienced scientists and business people have also provided comments about this fundamental error in the dEIS that resulted in a list of unnecessary restrictions. Again, the answer (contrary to the assertions made in the dEIS) is that higher production levels may not require more boat trips. For example, a planting trip with more staff and double the amount of seed on a single boat trip could be accomplished in the same time frame. A harvest trip with more staff could harvest double the product in the same time. With additional staff aboard, a crew could maintain twice the product in the same amount of time. Any need for management changes should be considered and determined by an adaptive management team – one that includes CDFG, NOAA and DBOC. Realistically, the variations in production contemplated in the dEIS “action alternatives” would likely have very little effect on boat use.”

cxii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 24, 2010, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement. This letter and its attachments were used as the basis for detail upon which this development concept is based.

cxiii. DBOC 2010f, Letter from Drakes Bay Oyster Company to California Coastal Commission on March 16, 2010, regarding Coastal Development Permit Application No: 2-06-003—response to CCC letter dated March 9, 2010. Items listed in this most recent submittal regarding DBOC’s Coastal Development Permit were used to construct this alternative.

cxiiii. DBOC 2012a, Letter from Drakes Bay Oyster Company (with attachments) to the California Coastal Commission on February 17, regarding CDP Application Number 2-06-003.

cxv. NPS 2003c, Letter from Point Reyes National Seashore Superintendent to Johnson Oyster Company on September 17.

“Regarding any new facilities that were authorized by the completion of the Johnson Oyster Replacement and Rehabilitation Environmental Assessment in 1998, the NPS revokes any authority for construction and replacement activities.”

cxv. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, 2011, regarding alternate building design. Attachments to this letter provide the detail upon which this development concept is based.

cxvi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"The seawater intake will be comprised of 2 – 4" black, high density polyethylene, fusion welded pipes, side by side. Two pipes will be used so that bio-fouling inside the pipes can be controlled. Only one pipe will be used at a time. The other pipe will be plugged while not in use. During the time of non-use, the fouling organisms in the idle pipeline will die, thereby allowing for full flow while pipe is in use. The intake will be screened using ¼" mesh screen with 16 square feet of surface area. The flow rate through the intake screen is .005 feet per second (attachment 3.m.1). The pipes will be installed side by side on the Estero bottom. The pipes will be anchored using two concrete anchors (attachment 3.f.1) every 100 feet. The anchors will be buried by hand on each side of the pipelines. The pipes will be fastened securely to the anchors with 3/8" stainless steel cable. The pipes will remain full of water at all times. The intake screen will be located approximately 2' above the bottom of the Estero and will be marked with a buoy secured with a concrete anchor. The intake screen will be maintained approximately two times per year. DBOC previously provided a map showing the proposed location of the seawater intake lines to CCC and NPS. A copy is attached to this letter for your convenience (attachment 3.m.2)."

cxvii. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, 2011, regarding alternate building design.

"The concept drawings do not show any worker housing except a manager's residence. Worker housing may be incorporated into the design in the future."

cxviii. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"47. Replacement of six picnic tables and six additional picnic tables "

cxix. DBOC 2012f, Letter (with attachments) from Drakes Bay Oyster Company to Special Park Uses Coordinator, Point Reyes National Seashore on February 17, regarding Cooking Grills.

"DBOC requests authorization in the CDP to provide twelve cooking grills for use by the visiting public. ... DBOC requests that it be allowed to use the same make and model grill that the NPS currently offers for public use at other locations within PRNS. The units are manufactured by Kay Park Recreation Corp, model 1635G (specifications attached)."

cxx. DBOC 2012a, Letter from Drakes Bay Oyster Company (with attachments) to the California Coastal Commission on February 17, 2012, regarding CDP Application Number 2-06-003.

"Install six additional picnic tables (for a total of 18 tables to serve the visiting public)"

cxx. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, 2011, regarding alternate building design. The displayed concept was attached to this letter.

An aerial photograph showing a wide river delta with multiple channels and sandbars, surrounded by green fields and a coastline in the background. The sky is clear and blue.

3

AFFECTED ENVIRONMENT

AFFECTED ENVIRONMENT

INTRODUCTION

The “Affected Environment” chapter describes the Drakes Estero environment; relevant physical and biological processes within Drakes Estero; and the existing conditions for those elements of the natural, cultural, and social environment that could be affected by the implementation of the actions considered in this EIS. The impact topics addressed in this EIS include wetlands, eelgrass, wildlife and wildlife habitat, special-status species, coastal flood zones, water quality, soundscapes, wilderness, visitor experience and recreation, socioeconomic resources, and NPS operations. Impacts for these impact topics are analyzed in “Chapter 4: Environmental Consequences.”

DRAKES ESTERO SETTING AND PROCESSES

PACIFIC COASTAL SHELF/NEARSHORE ENVIRONMENT

Drakes Estero is a shallow estuary characterized by terrestrial (land-derived) and oceanic influences. Sediment and nutrient cycling within Drakes Estero are driven primarily by tidal influence from the ocean, with minimal freshwater input. The open Pacific waters off the Point Reyes coast near the mouth of Drakes Estero are known as Drakes Bay (see figure 1-2). The U. S. owns the tidelands and submerged lands and NPS manages the marine environment from the shoreline to 0.25 miles offshore. Drakes Bay, beyond the quarter mile Seashore boundary, is part of the Gulf of the Farallones National Marine Sanctuary, an area encompassing nearly 1,300 square miles of coastal ocean habitat. Marine sanctuaries are federally designated areas protected under the National Marine Sanctuaries Act in recognition of their significance. The continental shelf off the coast of the Seashore extends 25 miles from the coast to the continental shelf break, at which point the ocean floor drops abruptly into the deeper Pacific waters. The Pacific waters at this location along the California coast are at a transition zone between the Californian and Oregonian marine provinces (i.e., oceanographic zones with specific physical characteristics) (Valentine 1966). This interface creates a condition where warm-temperate species from the Californian province coexist with cold-temperate species from the Oregonian province, resulting in a relatively high diversity of marine organisms on the continental shelf and nearshore environment at Point Reyes. The coastal ocean waters adjacent to the mouth of Drakes Estero are subject to “upwelling” (Morgan 2001; Hickey and Banas 2003), a Pacific coast phenomenon in which prevailing winds blow surface

waters away from the coast, allowing colder, nutrient-rich water to be pulled up from deeper ocean reserves (Kozloff 1983). The California coast is one of only five oceanic eastern boundary coastal upwelling areas in the world, and the only one in North America (Ryther 1969; Hill et al. 1998). Because of the upwelled nutrients, productivity from phytoplankton is high, serving as the foundation for the multiple trophic levels (i.e., feeding levels) of the diverse marine organisms found here (Kozloff 1983; Hickey and Banas 2003).

The central California coastline also is susceptible to changes related to climate change and sea level rise. Recent studies provide a range of sea level rise along the west coast given these influences. A California Climate Change Center report (Heberger et al. 2009) suggests a rise of 3 to 4.5 feet by year 2100; Cayan et al. (2009) suggests a range of 0.98 to 1.48 feet by year 2050; and NAS (2012b) provides a range of 1.38 to 5.48 feet by year 2100. At these projected rates, sea-level rise, on average, could reach approximately 5.9 to 6.6 inches on the high end of the range within the next 10 years.

The marine environment at Point Reyes is a dynamic medium for ocean life, owing to multiple currents driven by winds, tides, density gradients, topography, and the rotation of the earth (Denny and Wethey 2001). For example, nearshore currents often create microhabitats in the water column that trap organisms such as zooplankton, resulting in localized “hot spots” where predators such as fish, seabirds, and mammals are attracted to feed (Airamé, Gaines, and Caldwell 2003). In addition, water rich in nutrients and organic material from estuaries such as Drakes Estero, Tomales Bay, and the nearby San Francisco Bay contribute to the abundant and diverse species in the Gulf of the Farallones National Marine Sanctuary off the Point Reyes Peninsula. This phenomenon is referred to as “outwelling” (Teal 1962; Canuel et al. 1995) and is based on the net export of carbon and nutrients from high-productivity estuaries to adjacent open ocean waters.

The coastal marine environment is generally divided into benthic (bottom), pelagic (open water), subtidal (coastal areas below low tide), and intertidal (coastal areas between high and low tide) zones based on water depth, distance from shore, bathymetric gradient (contour of the bottom), and tidal exposure (how often, if at all, the substrate is exposed at low tide) (Bertness, Gaines, and Hay 2001). The biological community of each zone is distinctive. For example, in the pelagic zone, phytoplankton (small or microscopic free-floating plants) is the predominant source of primary productivity via photosynthesis. Primary productivity is the creation of plant tissue from solar energy, and photosynthesis is the process that occurs within plants to turn solar energy into plant tissue. In the subtidal zone, various species of kelp are dominant, and in the intertidal zone, algae capable of withstanding periods of exposure and drying are the dominant sources of primary productivity (Kozloff 1983).

In addition, the substrate across these habitat zones can range from soft-bottomed mud or sand to coarse gravel to rocky outcrops and benches, which affects the types and distribution of benthic organisms (those associated with the seafloor). Many species of fishes, invertebrates, and other marine life inhabit the soft sediments, either on the surface of the seafloor or burrowing in the seabed (Lenihan and Micheli 2001). These animals have adapted to the continuous shifting of sediments by ocean currents. Species that thrive in this environment include Dungeness crabs, sea pens, clams, and flatfishes such as California halibut and English sole. The complexity of rocky, hard-bottom areas provides very different habitats in comparison with soft-bottom communities. Species such as rockfish, kelp, soft corals, sponges, and anemones are common in rocky subtidal habitats, reflecting the high species diversity that can often accompany this habitat type (Witman and Dayton 2001). This abundance of benthic life on the continental

shelf attracts predators that typically inhabit the pelagic zone, including a diversity of fish, seabirds, and marine mammals.

Intertidal rocky shore habitats are common along coastal areas surrounding the Point Reyes Headland, which is identified by the state of California as an Area of Special Biological Significance and a Marine Reserve designated under the Marine Life Protection Act. Habitat zones in rocky intertidal areas respond to horizontal and vertical gradients caused by stressful conditions such as wave energy, salinity, and exposure to air (Menge and Branch 2001). The uppermost zone, also known as the splash zone, is rarely submerged; as a result, diversity in this stressful habitat is low, but species such as periwinkle snails, barnacles, and some types of green algae have adapted to live there. The mid zone, which is periodically exposed to air, harbors an abundance of organisms dwelling within the spaces between the rocks. Examples include mussels, limpets, crabs, anemones, chitons, black turban snails, and several species of algae (Barry et al. 1995). In the lower rocky intertidal zone, exposure to air is infrequent, so species inhabiting this zone are more adapted to withstand the physical stress of wave energy. Here, species such as sea urchins, sea stars, sea palms, and filamentous algae are common.

Sandy beach habitat, such as Drakes Beach near the mouth of Drakes Estero, is found in several locations along the Point Reyes Peninsula shoreline. Though these habitats appear biologically poor due to the lack of vegetation cover and visible wildlife, the beach is a biologically rich habitat with many burrowing animals that also serve as food for fish, mammals, and migratory birds (Kozloff 1983; Hubbard and Dugan 2003). Examples include sand crabs, Pismo clams, razor clams, and sand fleas. Because plants and algae cannot root in the sandy substrate, primary productivity on sandy beaches is typically provided by drift kelp and other seaweeds that wash ashore during normal tidal cycles or storm events (Kozloff 1983; Dugan et al. 2003). This “wrack line” is an important source of algae, food, and cover for many smaller animals, such as amphipods and isopods (small crustaceans), that live on the beach. These organisms in turn serve as a food source for higher-order predators living on or migrating across the California coast.

GEOLOGICAL SETTING

The geologic and geographic character of the Point Reyes Peninsula has been largely influenced by the nearby San Andreas Fault. The San Andreas Fault Zone approximates the eastern border of the Seashore from Bolinas Lagoon through the Olema Valley north to Tomales Bay (Clark and Brabb 1997) (see figure 1-2). This zone is an active tectonic boundary between the Pacific plate and the continental North American plate (Niemi and Hall 1992; Stoffer 2002). Because the Point Reyes Peninsula is on the Pacific plate side (west side) of the fault zone, much of the land area within the Seashore is of different geologic composition than the “mainland” portions of Marin County, which is on the North American plate, east of the fault zone (Clark and Brabb 1997). On the east side, the major formations originated from ocean-derived rocks that have been reworked over geologic time by tectonic activity. On the west side, the Point Reyes Peninsula is essentially an uplifted block of granite overlain by recent sedimentary rocks of terrestrial and marine origin (Galloway 1977).

The land immediately surrounding Drakes Estero, also known as the Point Reyes Plain, owes its moderately sloping topography to the underlying mudstone and siltstone rocks that were formed during the Pliocene Epoch (circa 5 million to 2 million years ago). This moderate terrain stands in contrast to the Inverness Ridge, a prominent, granite-based ridgeline at the eastern end of the Seashore that is much older

in geologic origin (Upper Cretaceous Period, circa 100 million to 65 million years ago). Flanking the western edge of the San Andreas Fault Zone, the Inverness Ridge is evidence of the tectonic forces at work along this major plate boundary over geologic time. Uplift and folding of rocks along the ridgeline have created a western slope characterized by short, steep valleys. Small tributary streams flow through these valleys and contribute freshwater to coastal lagoons such as Drakes Estero that lie immediately to the west (Galloway 1977).

INTERNAL GEOMETRY AND SEDIMENTS

The internal geometry of Drakes Estero and the nearby continental shelf reflect the prehistoric stream channel that conveyed surface water across the shelf during the last glacial period (Galloway 1977; Press 2005). The shallow, nearly level character of the Drakes Estero floor, outside of the main channel, is considered a remnant of a marsh system that flanked this former stream system. Because of its shallow nature, the distribution of sediments in Drakes Estero is largely controlled by tidal flushing rather than streamflow. Evidence for this phenomenon is provided by the sand, soft mud, and silt-laden substrate that dominates the Drakes Estero floor both at the surface and at depth (Anima 1990ⁱ; Press 2005). Studies of sediment distribution in Drakes Estero have found that coarser-textured sediments (medium- to fine-grained sand and silt) are more common in the main tidal channels, and that sediment near the mouth of Drakes Estero is composed of medium- to fine-, well-sorted sands. Sediments in the mid to upper portions of Drakes Estero, including the upper tidal branches, are predominantly composed of mud and silt. This is evident on the tidal flats as well as in the upper channels, which begin to lose their definition as they fill up with fine sediment over time (Anima 1991ⁱⁱ). One exception is the channel of Schooner Bay, which is artificially maintained by boat traffic scouring (disturbance of sediments) from the ongoing commercial shellfish operations (Anima 1991ⁱⁱⁱ).

The basin floor in Drakes Estero is an aggrading substrate, which means there has been a net accumulation of sediment over time. Using pollen core analysis, Mudie and Byrne (1980) estimated that sediment accumulated at a rate of approximately 20 inches (50 centimeters) per 100 years during the mid-1800s, dropping to approximately 6 inches (15 centimeters) per 100 years afterward. Using a variety of sampling methods, Anima (1990^{iv}, 1991^v) estimated similar sedimentation rates based on sample cores taken from various locations throughout Drakes Estero. The results from this study were highly variable, but overall average sedimentation rates were reported in the range of 5 to 12 inches (12 to 30 centimeters) per 100 years. Sediment accumulation was highest near the mouth (24 inches, or 60 centimeters, per 100 years), presumably due to ocean currents depositing sediments from the adjacent nearshore Pacific shelf. In certain locations, such as adjacent to the existing commercial shellfish operation's facility, high sedimentation rates and/or active mixing of sediments from boat traffic prevented accurate estimation. Anima's review (1990^{vi}) also suggests that approximately 100 feet (30 meters) of sediment has filled the valley at the mouth of Drakes Estero over recent geologic time, and that the onset of filling was approximately 8,000 years ago. The predominantly soft-sediment substrate of Drakes Estero described above is due in part to this infilling process. As a result, Drakes Estero is nearly lacking in hard substrate, with only a few minor locations where bedrock is exposed on the estuary floor (NAS 2009).

HYDRODYNAMICS

Drakes Estero is a shallow estuary encompassing approximately 3.5 square miles of tidal surface waters. It was formed during the last major glacial retreat as a system of drowned valleys extending north into the adjacent landscape (Galloway 1977). Drakes Estero has minimal freshwater input (Press 2005), and by its basin morphometry (shape and internal geometry) is characterized as a shallow, open embayment, with an average subtidal depth of around 6.5 feet (CCC 2007a). Deeper water is found in the mainstem portion of Drakes Estero, in a central channel that is artificially maintained by boat traffic. The deepest measurements of Drakes Estero occur near the mouth (23 to 26 feet) (CCC 2007a). Because of the open character of the lagoon and the low freshwater input, much of Drakes Estero is flushed by a semidiurnal (twice-daily) tidal cycle with a tidal range of around 6 feet, with seawater approaching coastal Pacific salinities (around 34 parts per thousand) (NOAA 2010). The tidal cycle has two unequal highs and two unequal lows (Kozloff 1983).

Drakes Estero is partially protected from the open ocean by Limantour Spit, a narrow, sandy ridge at the mouth of the embayment. Limantour Spit is a dynamic landform, as evidenced by the highly variable position of the Drakes Estero inlet, which has shifted location in historic and recent times (Anima 1990^{vii}). Variations in the position and depth of the inlet have influenced sediment dynamics and distribution within Drakes Estero.

Drakes Estero as a whole is a system of five branching bays, from west to east: Barries Bay (86 acres), Creamery Bay (133 acres), Schooner Bay (390 acres), Home Bay (190 acres), and Estero de Limantour (225 acres) (see figure 1-2). Nearly half of Drakes Estero's surface area consists of mud- and sand flats that are exposed at low tide (Press 2005). Because of the shallow character of the bay and its strong flushing tendency within a normal tidal cycle, currents in the mainstem and secondary channels are relatively strong. Further, the high width-to-depth ratio combined with this large exchange of water volume per tidal cycle ensures that Drakes Estero is well mixed, with no density layering in the water column (Wechsler 2004^{viii}).

BIOGEOCHEMICAL CYCLING

Biogeochemical cycling refers to the chemical interactions that exist between biological organisms and the abiotic (nonliving) components of the environment such as air, water, and soil. In estuaries, biogeochemical cycling can be controlled by a variety of physical forces and by the diversity of organisms that inhabit these rich coastal habitats. Regardless of the physical forces at work, estuaries are generally highly productive habitats due to the potential for organic and inorganic nutrients to cycle in all four of the above compartments (biota, air, water, soil), and due to the dynamic nature of the transitional environment that estuaries embody (Nixon et al. 1976). These transitions are related to environmental gradients such as saltwater to freshwater, open ocean to rivers, water to land, tidal flux to river flow, and deep water to shallow water (MacCready 1999). Further, estuaries receive nutrients, sediment, and detritus (dead organic material) from their contributing watersheds, as well as nutrients and sediments from open-ocean sources via tidal influx. As a result, estuaries support a diversity of life, from free-swimming organisms to benthic fauna and seagrasses to microbes and detritus feeders (Costanza, Kemp, and Boynton 1997). In addition, primary productivity (the formation of new organic material through biological processes, particularly photosynthesis) is typically high in estuaries, due to the various

photosynthetic organisms that can inhabit these environments, such as seagrasses, algae, and phytoplankton (Williams and Heck 2001).

Because Drakes Estero is a shallow coastal lagoon system with minimal freshwater input, it shares several features that affect biogeochemical cycling with other west coast estuaries, such as high sediment nutrient concentrations, extensive tidal flushing, and proximity to nutrient-rich upwelling zones along the coast. In other estuarine systems, such as those found on the east coast of North America and in Europe, filter-feeding organisms, such as bivalves, have been shown to play an important role in nutrient cycles and stimulation of primary productivity (Reusch, Chapman, and Gröger 1994; Peterson and Heck 1999, 2001; Newell and Koch 2004). The beneficial effects of filter feeders are often described in the context of “benthic-pelagic coupling”, which is the term used to describe the cycling of nutrients and organic matter between the bottom substrate (benthic system) and the overlying water column (pelagic system) (Dame 1996). With respect to bivalve molluscs such as oysters, the concept relates to the manner in which these filter feeders remove particulate organic and inorganic matter (including plankton) from the water column and, through the process of digestion and excretion, “repackage” that material into other forms that are more readily available for uptake by organisms inhabiting the bottom substrate (Lenihan and Micheli 2001). Filter feeding bivalves have been shown to influence biogeochemical cycling by providing ecological benefits such as reduced turbidity (Newell and Koch 2004), depression of harmful algal blooms (Dame and Prins 1998; Smaal, van Stralen, and Schuiling 2001), and stimulation of primary productivity through nutrient enrichment of nearby sediments where algae and/or submerged aquatic vegetation (SAV) such as eelgrass (*Zostera marina*) may be growing (Reusch, Chapman, and Groger 1994; Peterson and Heck 1999, 2001; Newell and Koch 2004). However, as Dumbauld, Ruesink, and Rumrill (2009) indicate, the nutrients provided by coastal upwelling in smaller west coast lagoon systems like Drakes Estero control summer primary productivity, a condition on which filter-feeding bivalves would have limited influence. In systems like Drakes Estero where bivalves are grown commercially, nutrient cycling benefits provided by commercially grown bivalves – like the benthic-pelagic coupling functions described above – are likely to be restricted localized areas adjacent to shellfish beds/structures.

Research on biogeochemistry in Drakes Estero is limited, but there have been a few studies documenting chemical and physical characteristics of the Drakes Estero sediments and water column. For example, in a research project that looked at the effects of oyster mariculture on benthic invertebrates, sediment and water samples were collected in and around oyster racks and analyzed for chemical constituents and physical properties (Harbin-Ireland 2004^x). From this research, the following observations were made: surface sediments in all samples were well oxygenated; percent organic matter was not different between oyster racks and nearby samples; and percent silt and percent sand were different between oyster racks and nearby samples. The primary researcher attributed the organic content in the sediments under and adjacent to racks to the availability of seagrass-based detritus, which was plentiful in the area of the study, and also suggested that the oxygen content of surface sediments was due to tidal mixing and seagrass root oxidation (Harbin-Ireland 2004^x). Further, the study pointed to a difference in sediment texture between racks and nearby samples, suggesting that erosion was taking place around the racks (Harbin-Ireland 2004^{xi}). Research on nutrient inputs from the watershed above Drakes Estero suggested that excess nutrient loading was not likely to occur in Drakes Estero due to the high rate of tidal flushing relative to stream inputs (NAS 2009).

Finally, Drakes Estero is potentially subjected to the effects of harmful algal blooms in coastal waters, also known as “red tides”, in which certain algae grow rapidly in response to warmer water temperatures

(Evens 2008). Red tides are regional in nature, occurring within Drakes Estero due to offshore influences that are brought in with the tides. The overabundance of algae during these times can result in the release of biotoxins, or biologically-derived toxic substances, that can accumulate in filter feeding organisms like bivalves. A condition known as PSP, which is a human health hazard, can result. PSP levels are monitored in Drakes Estero and can result in closure of commercial mariculture operations (CDPH 2012).

PRIMARY PRODUCTIVITY

In estuarine environments, the predominant sources of primary productivity are submerged aquatic vegetation, algae, and phytoplankton (Williams and Heck 2001). In Drakes Estero, eelgrass (*Zostera marina*) is the dominant form of submerged aquatic vegetation and is present throughout Drakes Estero in dense beds (Wechsler 2004^{xiii}). Eelgrass is described in more detail under the “Eelgrass” section of this chapter.

As with submerged aquatic vegetation, phytoplankton and epiphytes can represent a significant component of the overall primary productivity in estuaries (Cole and Cloern 1987; Carr, Boyer, and Brooks 2010). Phytoplankton is composed of microscopic, photosynthetic, free-floating organisms in the water column; epiphytes are photosynthetic algae that attach to submerged aquatic vegetation for support, usually seen as coatings on seagrass blades. Though there has been no scientific research on phytoplankton production in Drakes Estero, studies in nearby estuaries such as San Francisco Bay have demonstrated that productivity is controlled by light availability in the water column, which is adversely affected by water turbidity (high levels of suspended sediment in the water column) (Cloern 1987; Cole and Cloern 1987; Wilkerson et al. 2006). Given that water quality in Drakes Estero is relatively high (NAS 2009), it is likely that phytoplankton productivity is also high relative to other embayments within the region (Fourqurean et al. 1997; Smith and Hollibaugh 1997). However, epiphytes are expected to represent a minor component of the overall primary productivity in this region, as Carr, Boyer, and Brooks (2010) have noted for San Francisco Bay. This reemphasizes the dominant role that eelgrass and phytoplankton play in the overall primary productivity within Drakes Estero.

Finally, intertidal flats in Drakes Estero are frequently colonized by macroalgal mats, which are “blooms” of green marine algae that become encrusted on the sediment surface (Press 2005). This observation is consistent with studies in other Pacific coastal habitats (Josselyn and West 1985; Everett 1991, 1994). Based on research on the ecology of macroalgal mats in Drakes Estero, these features are not a major source of primary production in Drakes Estero, but may function as important habitat for benthic invertebrates and may also contribute to nutrient cycles in the sediments (Press 2005).

TERRESTRIAL SETTING

Terrestrial habitats within the Seashore are characterized by multiple vegetation cover types, ranging from low-elevation coastal dune communities to pine-dominated forests high along the Inverness Ridge. This variability reflects the character of the underlying geologic and soil formations, as well as the influence of the maritime climate and coastal watershed processes (Galloway 1977). In addition, the range and type of vegetation communities have been shaped by the past land uses of early human populations. Thousands of years ago, the Coast Miwoks used vegetation and land for both food and shelter (Slaymaker 1982). From

the mid-19th century to present, land uses related to agriculture and commercial activities (land clearing, road building, livestock grazing, etc.) have had a dramatic effect on the landscape.

Terrestrial Vegetation

Terrestrial plant life on the Point Reyes Peninsula is both abundant and diverse, with 910 observed plant species within the Seashore. Vegetation cover types within the Drakes Estero watershed include wetlands, coastal dune, coastal scrub, grassland, pasture, and riparian woodland. Wetlands are discussed as a separate impact topic later in this chapter, because they occur in the project area and there is the potential for these resources to be impacted by the alternatives considered in this EIS.

Coastal Dune. This vegetation cover type includes active coastal dunes, northern foredunes, northern foredune grasslands, and northern dune scrub communities (Holland 1986). Coastal dunes are not found within the project area, but occur at the mouth of Drakes Estero. Active dunes are highly mobile sand formations often found near sandy beaches in the absence of coastal headlands. Generally barren of stabilizing vegetation, the shape and size of coastal dunes frequently change based on wind direction, speed, topography, sand source, and sand grain size. In foredune areas, stabilizing vegetation increases in density, forming patches of native plants within a greater dune habitat dominated by nonnative species. However, coverage of vegetation is usually low, and patches of bare sand are common. Dense, nonnative monocultures (areas dominated by one species) are commonly dominated by European beachgrass (*Ammophila arenaria*) or ice plant (*Carpobrotus edulis*). Native plants are usually limited to remnant patches comprised of dune sagebrush (*Artemisia pycnocephala*), coast buckwheat (*Eriogonum latifolium*), dune lupine (*Lupinus chamissonis*), American beachgrass (*Ammophila breviligulata*), and goldenbush (*Ericameria ericoides*). Nonnative species are commonly interspersed within native plant communities of the coastal dune cover type.

Coastal Scrub. This vegetation cover type is characterized by woody shrub species from 3 to 7 feet tall. Coastal scrub is fairly widespread and includes most shrub-dominated lands within the Seashore. Shrubs are defined as woody perennials with multiple stems growing from the base. Most California shrublands have an abundance of xerophytes (species adapted to arid conditions) (McMinn 1939). In coastal areas, shrubs often form low-growing stands mixed with grasses. Coastal scrub is usually located inland of foredunes, where decreased wind and salt spray allow better stabilization and increased plant height. Other species associated with coastal scrub include coyote brush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*), sedges, rushes, poison oak (*Toxicodendron diversilobum*), coffeeberry (*Rhamnus californica*), thimbleberry (*Rubus parviflorus*), and California sagebrush (*Artemisia californica*) (McMinn 1939; Holland 1986). Within the project area, the coastal scrub vegetation cover type is present around the DBOC onshore facility and along the main access road (see figure 3-2 in the “Wetlands” section below); however, impacts to this vegetation cover type would be negligible.

Grassland. California coastal prairie, a type of grassland, is the dominant vegetation cover type within the Seashore. Nonnative annual grasses from the Mediterranean region have replaced native grasses to become the dominant species in California grasslands (Jackson 1985). Nonnative velvet grass (*Holcus lanatus*) often dominates grasslands, while small communities of remaining native plant species are comprised of Pacific reedgrass (*Calamagrostis nutkaensis*), tufted hairgrass (*Deschampsia cespitosa*), California oatgrass (*Danthonia californica*), meadow barley (*Hordeum brachyantherum*), and California brome (*Bromus*

carinatus) (Sawyer and Keeler-Wolf 1995). The most common of these, Pacific reedgrass, is sometimes intermingled with sedges and rushes (within wetland cover types) and nonnative species.

Pasture. Pasturelands are distinct cover types in which land is specifically used to graze cattle or is managed to produce silage for cattle. Pasture vegetation is comprised of perennial grasses and legumes (species in the bean family) that usually provide up to 100 percent canopy closure. According to season and livestock stocking levels, height of vegetation varies from a few inches to 2 or more feet on fertile soils before grazing. The mix of grasses and legumes varies according to management practices such as seed mixture, fertilization, soil type, irrigation, weed control, and the type of livestock on the pasture (Mayer and Laudenslayer 1988). Plant species within pastures vary with the geographic area. Species documented in pastures in Point Reyes Peninsula include nonnative species such as Italian ryegrass (*Lolium multiflorum*), velvet grass, and tall fescue (*Festuca arundinacea*), as well as several species of native and nonnative clovers (*Trifolium* spp.).

Riparian Woodland. Riparian woodland includes both forests and scrublands found in areas directly adjacent to streams and their associated water resources (wetlands). They are often dominated by deciduous trees and shrubs such as red alder (*Alnus rubra*) and willows (*Salix* spp.) (Sawyer and Keeler-Wolf 1995). Herbaceous associate species include multiple berry species (*Rubus* spp.), hedgenettle (*Stachys ajugoides*), sedges, rushes, small-fruited bulrush (*Scirpus microcarpus*), sword fern (*Polystichum munitum*), and lady fern (*Athyrium filix-femina*) (Holland 1986).

Terrestrial Wildlife

The diversity of animals within the terrestrial habitats surrounding Drakes Estero has been estimated based on known observations of species and habitats present. In general, the Seashore supports 27 species of reptiles and amphibians, countless invertebrates, 65 species of mammals, and 490 species of birds. The discussion below provides a general overview of the animals found within the area surrounding Drakes Estero. Those species that occur in the immediate project area and have the potential to be impacted by the alternatives considered in this EIS are discussed as separate impact topics (under “Wildlife and Wildlife Habitat”) in this chapter. In addition, many animal species at the Seashore are protected by the federal or state endangered species acts (see the “Special-status Species” sections in chapters 1 and 4; see also appendix E).

Mammals. Terrestrial mammal species commonly observed within the Seashore include dusky-footed woodrat (*Neotoma fuscipes monochroura*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), black-tailed deer (*Odocoileus hemionus columbianus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), black-tailed hare (*Lepus californicus californicus*), brush rabbit (*Sylvilagus bachmani ubericolor*), pocket gopher (*Thomomys bottae*), and many species of bats, shrews, mice, and moles. Mountain lion (*Felis concolor*) are present although rarely seen, and coyotes (*Canis latrans*) are widespread. Additionally, tule elk (*Cervus elaphus nannodes*), once extirpated from the Point Reyes Peninsula, have been successfully reintroduced and are observed regularly in several areas of the Seashore.

Amphibians and Reptiles. Common amphibians found in the Seashore include California newts (*Taricha torosa*), Pacific chorus frog (*Pseudacris regilla*), roughskinned newts (*Taricha granulosa*), and nonnative bullfrogs (*Rana catesbeiana*). The Pacific giant salamander (*Dicamptodon ensatus*) can be found near streams. The federally threatened California red-legged frog (*Rana aurora draytonii*) also occurs within the Seashore but is not known to occur within the project area (see “Special-Status Species” discussion in chapter 1). Common reptiles include western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Gerrhonotus coeruleus*), Pacific gopher snake (*Pituophis melanoleucus*), western terrestrial garter snake (*Thamnophis elegans*), and western pond turtle (*Clemmys marmorata*).

Birds. The Seashore is also well known for its bird populations. The Point Reyes Peninsula provides habitat for many resident and migratory birds. Approximately 490 bird species, including landbirds, seabirds, and shorebirds, have been documented within the Seashore boundaries. This large number of observed species (approximately 45 percent of the total number of species observed in the U.S.) is attributed to the unique geographic setting, abundant and diverse habitat availability, and maritime climate. Geographically, the U.S. Pacific coast and its adjacent interior valleys provide winter destinations for seabirds and shorebirds that breed in the Arctic and temperate zones of eastern Siberia, Alaska, and Canada, and migrate along the Pacific flyway (the migration corridor from Alaska to Patagonia). Additionally, the east–west orientation of the Point Reyes Peninsula attracts many of these migratory species, by presenting unique habitat types within the transitions between pelagic, subtidal, intertidal, and terrestrial environments.

Landbirds, which occupy terrestrial habitats for most of their life cycle, are abundant on Point Reyes Peninsula. Like other types of birds, landbirds can include year-round residents, short-term migrants, and long-term migrants (Rich et al. 2004). Nesting grounds and wintering grounds are found within the large variety of terrestrial habitat types on Point Reyes Peninsula, including coastal dune, coastal scrub, riparian woodland, (including coniferous and hardwood forest), grassland, and headwater wetlands. General categories of landbirds include songbirds, birds of prey, and upland gamebirds. A species of particular note is the northern spotted owl (*Strix occidentalis caurina*), which is a federally threatened species protected under the ESA.

Nonnative Terrestrial Animals. Nonnative animals also occur in the terrestrial portions of the Seashore. Axis deer (*Axis axis*) and fallow deer (*Dama dama*) were released by a local landowner for hunting but have been substantially reduced through recent Seashore programs. Nonnative animals include red fox (*Vulpes vulpes*), Norway rat (*Rattus norvegicus*), Virginia opossum (*Didelphis virginiana*), and common house cats (*Felis domesticus*). Nonnative bird species include house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), and wild turkeys (*Meleagris gallopavo*).

IMPACT TOPIC: WETLANDS AND OTHER WATERS OF THE U.S.

The federal government has defined waters of the U.S. to include a wide variety of aquatic systems (33CFR 328.3). Two sections of this definition that apply to Drakes Estero are:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters.

Wetlands, as separately classified ecosystems, are designated as a special aquatic site under section 404 of the Clean Water Act (CWA) and are therefore a subset to waters of the U.S. The identification of wetlands and other waters of the U.S. within the project area is necessary to ensure their protection in accordance with federal laws (section 404 of the CWA and the Rivers and Harbors Act of 1899) and state laws (the California Coastal Act of 1976 and the California Environmental Quality Act). Under section 404, areas below the high tide line are automatically jurisdictional. Areas with less than 5 percent vegetation are classified as tidal “waters of the U.S.” and those with more than 5 percent vegetation are classified as tidal “wetlands.” Above the high tide line, wetlands are defined as:

Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. (33 CFR 328.3[b]; 40 CFR 230.3[t])

Using this definition, a wetland above the high tide line requires the presence of three parameters: hydric soil, a dominance of hydrophytic vegetation, and hydrology at or above the ground surface, although it is recognized that some areas may only exhibit two parameters: soils and hydrology. Wetlands that meet the EPA/USACE definition relying on two parameters (soils and hydrology) are still recognized as a “water of the U.S.” and are therefore regulated under section 404 of the CWA.

The USFWS has developed a wetland definition that is more comprehensive than the EPA/USACE definition, recognizing that physical or chemical conditions such as wave action, currents, or high salinity may prevent development of hydric soils or hydrophytic vegetation in some wetland types (Cowardin et al. 1979). Therefore, some unvegetated and/or nonhydric soil sites, such as mudflats or high-energy shorelines, may not exhibit all three attributes but are still classified as wetlands. Nonetheless, all unvegetated mudflats, marshes, shorelines and subtidal aquatic systems below the ordinary high tide elevation are regulated as waters of the U.S. by USACE.

USFWS uses the following definition of wetlands.

Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this

classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The term wetland includes a variety of areas that fall into one of five categories; (1) areas with hydrophytes and hydric soils, such as those commonly known as marshes, swamps, and bogs; (2) areas without hydrophytes but with hydric soils – for example flats where drastic fluctuation in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes; (3) areas with hydrophytes but nonhydric soils, such as margins of impoundments or excavations where hydrophytes have become established but hydric soils have not yet developed; (4) areas without soils but with hydrophytes such as the seaweed-covered portion of rocky shores; and (5) wetlands without soil and without hydrophytes, such as gravel beaches or rocky shores without vegetation. (Cowardin et al. 1979)

In 1977, President Carter issued Executive Order 11990, “Protection of Wetlands,” for all federal agencies. As a result, NPS issued *Director’s Order 77-1: Wetland Protection* (DO-77-1) to establish “NPS policies, requirements, and standards for implementing Executive Order 11990” (NPS 2002a). This order instructs NPS to use the USFWS determination outlined in Cowardin et al. (1979) as the standard for defining, classifying, and inventorying wetlands and determining when NPS actions have the potential to adversely impact wetlands.

DRAKES ESTERO WETLANDS AND OTHER WATERS

Drakes Estero is a shallow, coastal marine lagoon approximately 3.5 square miles in surface area at high tide. Water depths range from approximately 26 feet near the mouth of Drakes Bay to less than 7 feet across much of the lagoon (Anima 1991^{xiii}), with an average subtidal depth of around 6.5 feet (CCC 2007a). The mean tidal range of Drakes Estero is approximately 6.2 feet (Pendleton et al. 2005) to 6.5 feet (CCC 2007a). Drakes Estero consists of five narrow bays: Barries Bay, Creamery Bay, Schooner Bay, Home Bay, and Estero de Limantour. Anima (1991^{xiv}) describes Drakes Estero (all five bays) as having approximately 1.8 square miles (1,152 acres) of intertidal flats exposed during low tide. Six perennial and four ephemeral freshwater streams flow into Drakes Estero and originate from a 31-square-mile watershed, including Drakes Estero itself (Baltan 2006).

This section describes the wetland systems above the mean low tide elevation up to the high tide line and including the land associated with the onshore facilities using the Cowardin wetland classification system (Cowardin et al. 1979). Other waters of the U.S. occur below the low tide elevation (subaquatic habitats). Large portions of the subaquatic areas in Drakes Estero are dominated by eelgrass. This EIS separates the eelgrass areas as a separate impact topic, and a more thorough description is provided in the “Eelgrass” section of this chapter. Estero de Limantour, because it falls very near the mouth of Drakes Bay and contains no mariculture facilities, is disassociated with and outside the project area, and is not considered in this section of the EIS.

A qualitative inventory of wetlands and other waters of the U.S. is summarized based on data collected by NPS staff with references such as the NPS wetlands GIS database, the *National Wetlands Inventory* established by USFWS (USFWS 1985a), local soil survey information (Natural Resources Conservation Service 2011), and aerial photographic interpretation. The Seashore's GIS database relies on soil and *National Wetlands Inventory* information but also includes NPS field-verification of wetlands surrounding Creamery and Schooner bays. In preparation for this EIS, NPS park staff mapped wetlands within the study area based on 2009 aerial photos and digitized using ArcGIS. Wetlands at the onshore facilities were mapped based on a site-specific field inspection (NPS 2011n).

Wetlands and other waters of the U.S. within the project area occur as estuarine intertidal or palustrine systems. At low tide, much of the Drakes Estero bottom is exposed as intertidal wetlands, most of which contain no vegetation (i.e., the sandy shorelines, sandbars, and mudflats) (Anima 1991^{xv}). The intertidal sand and mudflat wetland types are the most common wetlands within the project area. Intertidal vegetated marshes (E2EM1 systems) can be found within the upper, shallow-water reaches of each of the bays interlaced by shallow tidal creeks (E2SB systems). Palustrine systems occur landward of the tidal zone dominated by freshwater marshes (PEM) with pockets of scrub-shrub (PSS) in low-lying guts and valleys along streams and/or groundwater seeps. Vegetated tidal marshes upstream of Sir Francis Drake Boulevard and upstream of Estero Trail are not influenced by oyster operations and are physically constrained from the rest of Drakes Estero by physical impediments to natural flow regimes including culverts and a breached dam feature.

Commercial oyster operations have been an activity at Drakes Estero spanning decades. Between the 1950s and 1970s, much of the upland areas currently supporting the onshore operations, mobile housing units, and kayak parking area were once tidal marsh filled by operators of the time. An historic aerial photograph from 1943 depicts the onshore facilities prior to the wetland and shoreline fill. The pond immediately north of the onshore facilities was originally a vegetated marsh. The pond was created by installation of a culverted outflow when the entrance road was installed. The loss of vegetated marsh and shoreline, associated with the development between the 1940s and 1970s, is estimated to be approximately 3.8 acres. Today, wetlands within and around the onshore facilities include estuarine intertidal and subtidal wetlands (E2EM and E1/E2UB3) along the northern boundary of the developed area and extending eastward, where wetlands transition into a freshwater marsh (PEM) and scrub-shrub (PSS) habitat type. The open water area, or pond, on the north side of the onshore developed area is classified as an E1UB3 system (estuarine subtidal unconsolidated bottom mud).

Existing permitted culture beds occur within various wetland classification types. Roughly 65 acres of permitted beds occur within the E1/2AB3 wetland type, primarily associated with the racks. Remaining permitted beds occur with E2US3 wetlands (15 acres) and E3US1/2 wetlands (65 acres) mostly for bottom bags.

Characteristic species within the intertidal wetland communities include saltgrass (*Distichlis spicata*), pickleweed (*Salicornia pacifica*), Pacific cordgrass (*Spartina foliosa*), salt marsh daisy (*Jaumea carnosa*), gumweed (*Grindelia* spp.), and goose tongue (*Plantago maritima*). Freshwater herbaceous wetlands are often dominated by canary reedgrass (*Phalaris arundinacea*), slough sedge (*Carex obnupta*), grasses (e.g., *Calamagrostis* spp.), rushes (*Juncus* spp.), scirpoid sedges (*Scirpus* spp.), and cattails (*Typha* spp.) (Holland 1986; NPS 2011n).

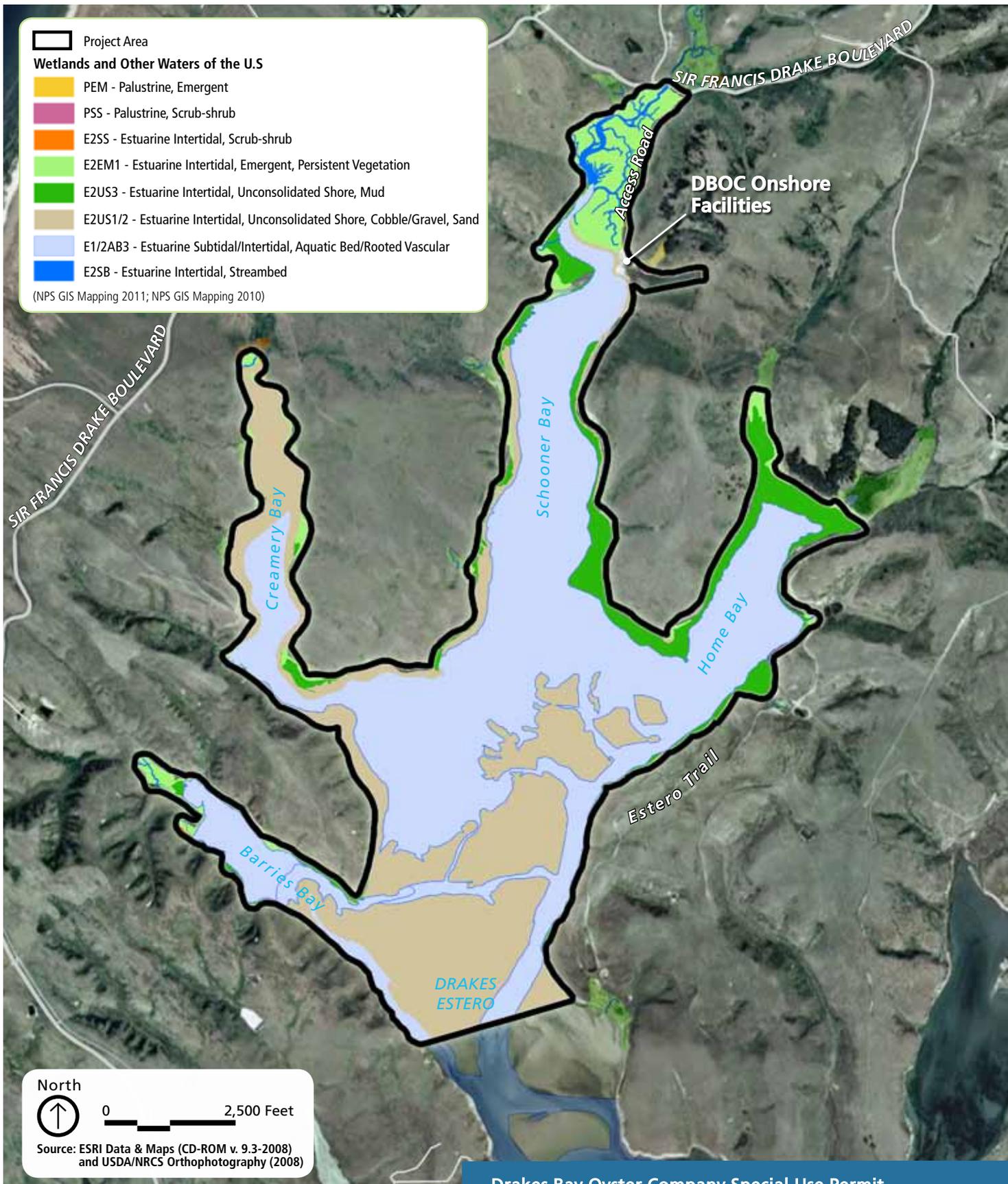
A list of wetlands and other waters of the U.S. present within the project area is provided in table 3-1. Figures 3-1 and 3-2 provide a general representation of the wetland types in the project area.

TABLE 3-1. WETLANDS AND OTHER WATERS OF THE U.S. IN THE PROJECT AREA

Wetland Type	Classification Code	Description
Estuarine intertidal, unconsolidated shore, cobble/gravel, sand	E2US1/2	Gravel and sandy beaches and exposed tidal sandbars formed by accretion/deposition in shallows and along shorelines.
Estuarine intertidal, unconsolidated shore, mud	E2US3	Occurs primarily in the upper reaches of the bays as unvegetated mudflats.
Estuarine intertidal, emergent, persistent vegetation	E2EM1	Tidal marshes dominated by emergent vegetation. Plant species include glasswort (<i>Salicornia virginica</i>), saltgrass (<i>Distichlis spicata</i>), and salt marsh daisy (<i>Jaumea carnosa</i>).
Estuarine intertidal, scrub-shrub	E2SS	Shrub wetlands that occur behind the DBOC onshore operations center and at the headwaters of Creamery Bay.
Estuarine intertidal, streambed	E2SB	Intertidal creeks at the northernmost ends of various bays.
Palustrine, emergent	PEM	Nontidal marshes and slough dominated by sedges (<i>Carex</i> spp.) and rushes (<i>Juncus</i> spp.).
Palustrine, scrub-shrub	PSS	Small patch of freshwater scrub-shrub wetlands located behind (east of) DBOC onshore facilities.
Estuarine subtidal/intertidal, aquatic bed/rooted vascular	E1/2AB3	Generally consistent with areas defined as eelgrass beds. See "Impact Topic: Eelgrass" for description.

Note: Wetlands and other waters of the U.S. are classified using the Cowardin system (Cowardin et al. 1979).

Wetlands and other waters of the U.S. within the project area, which are located within the coastal zone, are exposed to the effects of sea-level rise due to a variety of influences to include wind-driven differences in ocean heights; gravitational and deformational effects from melting ice; water expansion from increasing ocean temperatures; and vertical land motions or tectonics (NAS 2012b). Recent studies provide a range of sea level rise along the west coast given these influences. A California Climate Change Center report (Heberger et al. 2009) suggests a rise of 3 to 4.5 feet by year 2100; Cayan et al. (2009) suggests a range of 0.98 to 1.48 feet by year 2050; and NAS (2012b) provides a range of 1.38 to 5.48 feet by year 2100. At these projected rates, sea-level rise, on average, could reach approximately 5.9 to 6.6 inches on the high end of the range within the next 10 years. Under such changes, much of the wetland area described above would be under water for the duration of the tidal cycle, effectively changing the character of the wetland and shifting the prevailing hydrologic regime inland. In terms of land area, the potential effect of such changes is unknown; however, for most of the California coast, thousands of wetland acres are expected to experience dynamic changes in hydrology and ecosystem function over the time trajectory described above (Heberger et al. 2009; NAS 2012b).

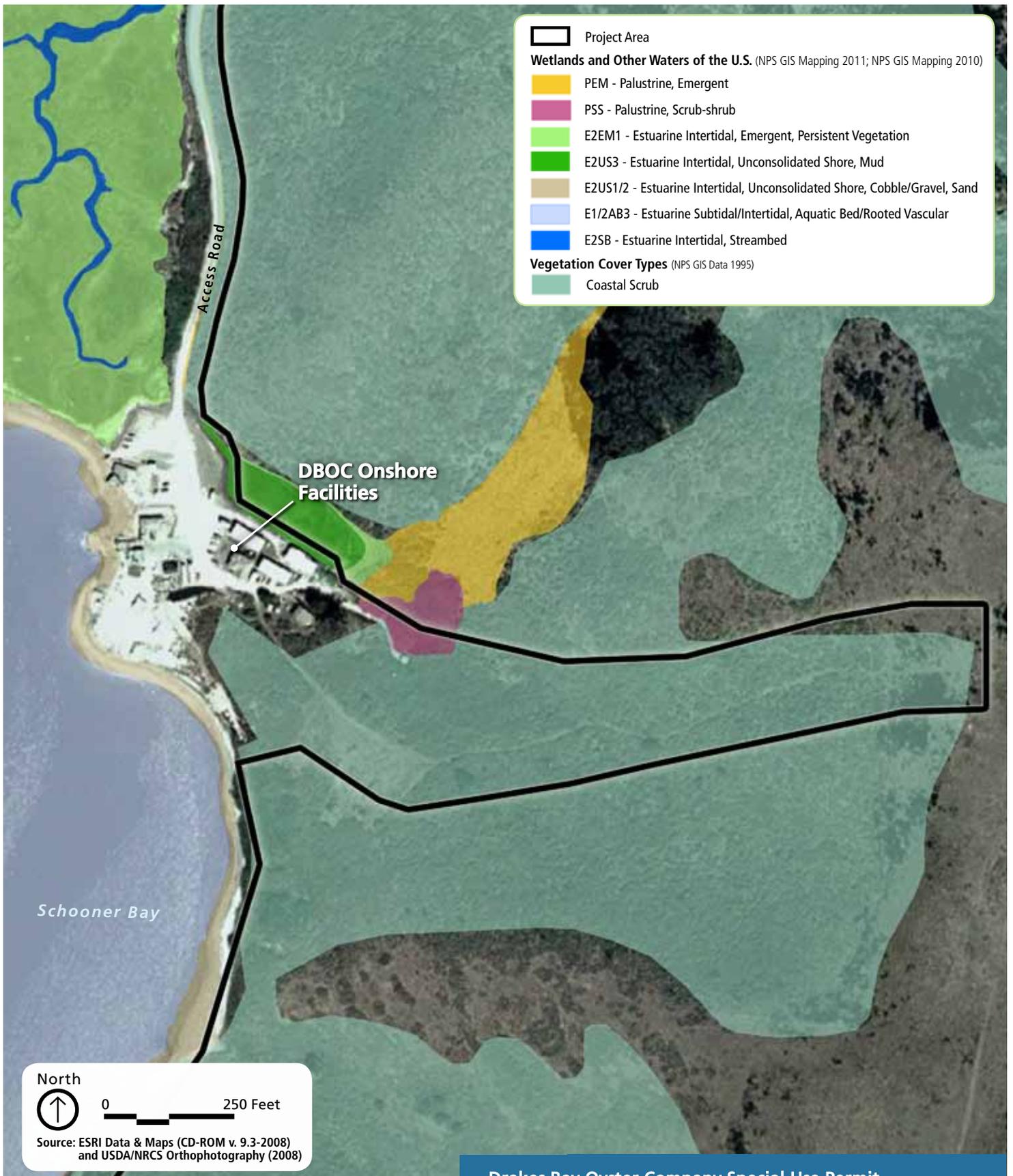


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**FIGURE 3-1
Wetlands and Other Waters of the U.S.**



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Point Reyes National Seashore

FIGURE 3-2

Wetlands and Other Waters of the U.S. and Onshore Vegetation

IMPACT TOPIC: EELGRASS

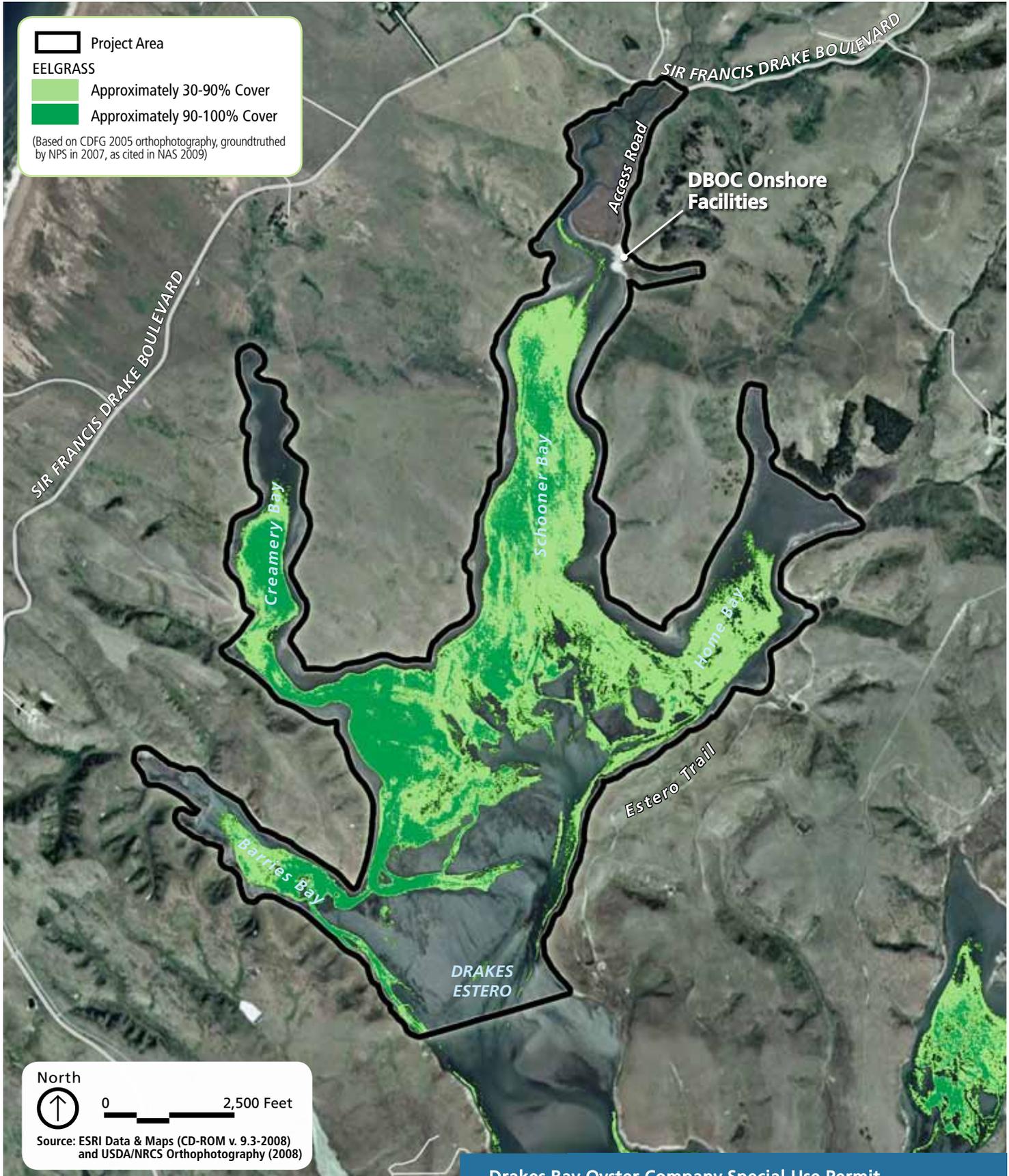
In Drakes Estero, eelgrass is the dominant form of submerged aquatic vegetation and is present throughout Drakes Estero in dense beds (figure 3-3). As Press (2005) describes it: “The eelgrass *Zostera marina* dominates the subtidal zone, with extensive beds present everywhere except the exposed intertidal zones, the deepest channels, and the dynamic area surrounding the Drakes Estero opening.” In addition to eelgrass, Wechsler (2004^{xvi}) noted other photosynthetic organisms such as giant kelp (*Macrocystis pyrifera*) and big-leaf algae (*Ulva* spp.) present in Drakes Estero, but these were minor in distribution compared to eelgrass. Wechsler also observed that eelgrass beds were an important foraging and breeding ground for many aquatic organisms, including juvenile fish (2004^{xvii}). Eelgrass beds help to structure the food web (the “web” of relationships between organisms and their primary food sources) in many coastal habitats, particularly those such as Drakes Estero where eelgrass is a dominant photosynthetic organism in the system (see discussion under “Primary Productivity”). In addition, eelgrass provides important habitat for fish, invertebrates, and other aquatic organisms, as well as foraging grounds for many types of waterbirds and shorebirds, such as the black brant (for further discussion, see impact topics covered under “Wildlife and Wildlife Habitat”). Further, eelgrass beds can perform important environmental functions, such as trapping sediment, taking up excess nutrients, and protecting shorelines from erosion by decreasing wave energy (Williams and Heck 2001).

Eelgrass beds are classified as a type of “special aquatic site,” a category of waters of the U.S. afforded additional consideration under the CWA section 404(b)(1) guidelines developed by EPA. USACE uses these guidelines as the environmental standards by which to evaluate dredge and fill activities regulated under section 404 of the CWA. The guidelines are also used to establish mitigation requirements for impacts to such resources. Under the 404(b)(1) guidelines, special aquatic sites are subject to greater protection because of their significant contribution to the overall environment. Special aquatic sites possess unique characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These sites are generally recognized as significantly influencing or positively contributing to the overall environmental health or vitality of the entire ecosystem of a region.

Eelgrass beds such as those found in Drakes Estero would be considered “vegetated shallows” under the possible special aquatic sites described in the Federal Register (40 CFR 230, section 404[b][1]).

Seagrasses are included within habitat areas of particular concern for fish species within the Pacific Groundfish Fishery Management Plan (Groundfish Plan; PFMC 2008) and are considered essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act of 1976. The act defines essential fish habitat as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” According to essential fish habitat guidelines, “waters” includes aquatic areas and their associated physical, biological, and chemical properties that are used by fish, and may include aquatic areas historically used by fish. “Substrate” includes sediment, hard bottom, structures underlying waters, and associated biological communities (NMFS 2011b).

Additionally, estuaries, canopy kelp, seagrass, and rocky reefs are designated as habitat areas of particular concern for several fish species within the Groundfish Plan (PFMC 2008). Habitat areas of particular concern are subsets of essential fish habitat that are rare, particularly susceptible to human-induced habitat degradation, especially ecologically important, or located in an environmentally stressed area.



Project Area
EELGRASS
 Approximately 30-90% Cover
 Approximately 90-100% Cover
(Based on CDFG 2005 orthophotography, groundtruthed by NPS in 2007, as cited in NAS 2009)

North
 0 2,500 Feet
Source: ESRI Data & Maps (CD-ROM v. 9.3-2008) and USDA/NRCS Orthophotography (2008)

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FIGURE 3-3
Eelgrass Cover

When reviewed under the legislative purview of the Magnuson-Stevens Fishery Conservation and Management Act, additional scrutiny is given to projects in areas designated as habitat areas of particular concern. In recognizing the importance of maintaining healthy populations of eelgrass for habitat and ecosystem functions, the Southern California eelgrass mitigation policy has been adopted by regulatory agencies. The policy is a set of guidelines and requirements for eelgrass mitigation in the coastal zone of Southern California (NOAA 2005). Similar guidelines for the entire state of California have been drafted by NMFS and have been released for public review and comment (77 Federal Register 47 [09 March 2012], pp. 29150-29151). Although the California Eelgrass Mitigation Policy has not been officially adopted for use by the agencies, the guidelines in that policy are based on the Southern California model. For coastal projects requiring review by NMFS, USFWS, and/or CDFG, this policy will provide the standardized interagency guidance on mitigating adverse impacts to eelgrass resources.

Total coverage of eelgrass is difficult to measure because eelgrass grows at different densities throughout Drakes Estero. A convenient method for estimating coverage is to separate eelgrass into different cover classes that can be interpreted based on aerial photography; for example, 90 to 100 percent cover (percentage of area covered by eelgrass) and 30 to 90 percent cover. Based on CDFG images from 2007, eelgrass coverage in Drakes Estero is estimated at approximately 353 acres (90 to 100 percent coverage) and 384 acres (30 to 90 percent coverage) (figure 3-3). The effects of propeller scars can easily be observed as linear, dark signatures through seagrass beds on high-resolution aerial photography (Zieman 1976). In its review of shellfish operation impacts on eelgrass in Drakes Estero, NAS (2009) cites data reported by NPS that an estimated 50 acres of eelgrass habitat that was impacted by propeller damage based on review of 2007 aerial photography, but qualifies the estimate by saying that it was “loosely quantified” due to the poor resolution of the imagery used. This 50-acre quantity was based on an area drawn around all sections of Drakes Estero with propeller scars.

In an effort to provide a more detailed and current assessment of propeller damage to eelgrass, recent (2010) high-resolution aerial photography of Drakes Estero (CDFG 2010d) was evaluated using GIS technology. This evaluation showed that 8.5 miles (45,031 linear feet) of propeller scars through eelgrass are readily seen on the aerial images primarily across areas of Schooner Bay and the main body of Drakes Estero (figure 3-4). This figure represents a point-in-time estimate of propeller scarring in the estero as represented by the 2010 images. Due to the large variability among the widths of scars, this analysis method was not suited for calculating a comparable quantity for comparison with the 50-acre quantity reported by NAS (2009). The width of the scars that were identifiable on the photographs varied from approximately 3 feet where a single track is visible (assumption based on the minimum width detectable at the scale and resolution of the aerial photographs) to 60 feet near the main channel in Schooner Bay; therefore, no uniform width was assigned to this estimate. Further, it was assumed that any scars visible at the scale of photography used in this analysis represented areas where eelgrass had been removed down to the level of the substrate because of the conspicuous contrast between the linear dark line (scar) and the surrounding green medium (eelgrass) on the photograph (i.e., propeller damage that exposed the substrate so that it was visible on the photograph at 1:600 scale). Interpretation of propeller scarring on the 2010 aerial photographs (CDFG 2010d) was limited to areas that were clearly identifiable as scars; therefore, the 8.5-mile total is likely an underestimate (figure 3-4). Scarring observed in algae, which appeared as brighter green zones on the photographs, was not included in the analysis.

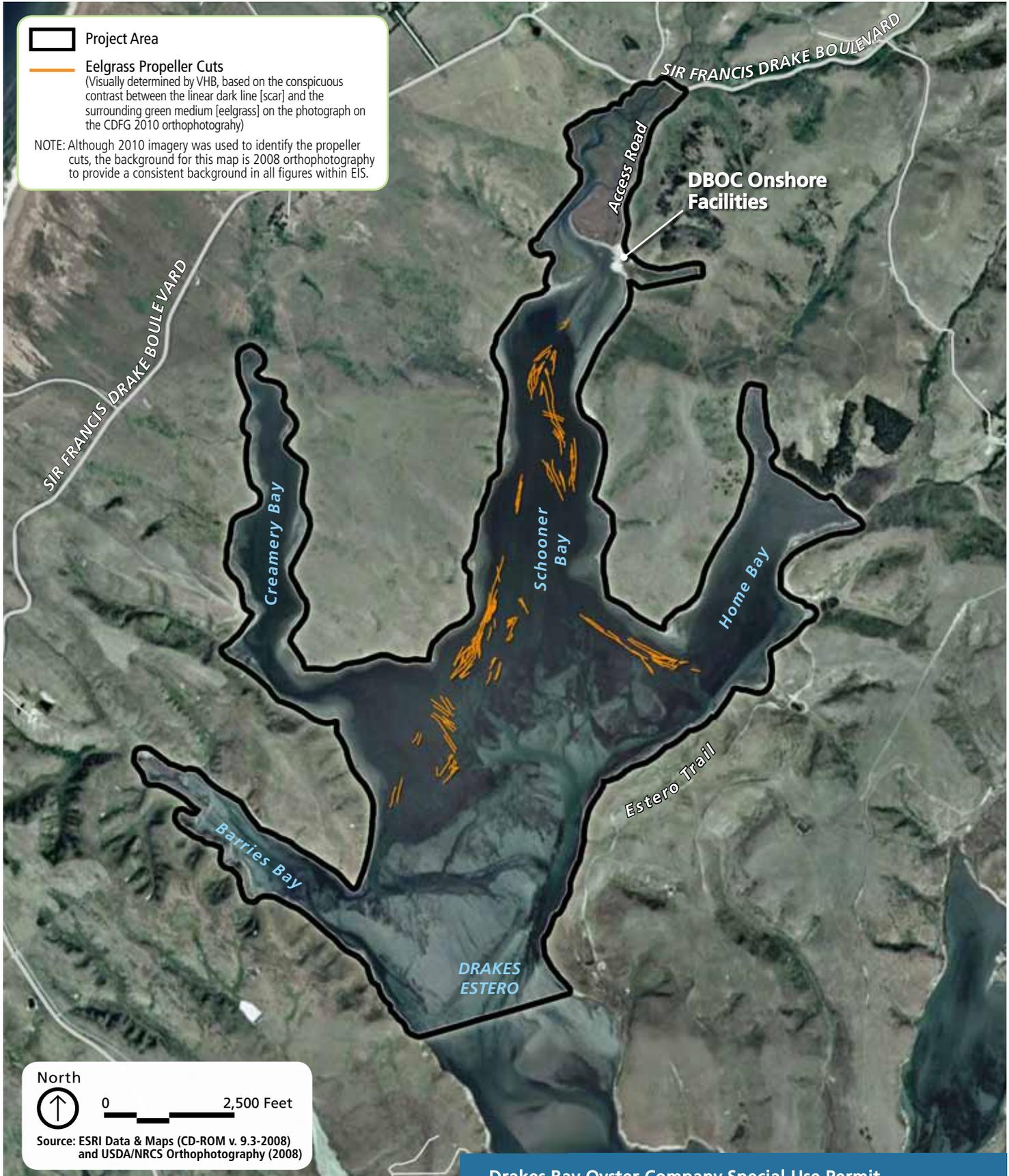


Project Area

Eelgrass Propeller Cuts

(Visually determined by VHB, based on the conspicuous contrast between the linear dark line [scar] and the surrounding green medium [eelgrass] on the photograph on the CDFG 2010 orthophotography)

NOTE: Although 2010 imagery was used to identify the propeller cuts, the background for this map is 2008 orthophotography to provide a consistent background in all figures within EIS.



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**FIGURE 3-4
Eelgrass Propeller Cuts**

IMPACT TOPIC: WILDLIFE AND WILDLIFE HABITAT

BENTHIC FAUNA

The term “benthic fauna” refers to species of animals that live on or in the substrate (bottom dwellers). Examples of benthic fauna include, but are not limited to, crabs, shrimp, snails, clams, and oysters. In estuaries, benthic organisms are often regarded as significant components of the food web, providing resources for a variety of predators and performing important ecological functions (Trianni 1995; Bruno and Bertness 2001; Dumbauld, Brooks, and Posey 2001; Welsh 2003). Benthic invertebrates are also known to show rapid and measurable responses to changes in the environment; for this reason, the benthos (the community of benthic organisms) is often cited as an indicator of habitat degradation or, conversely, habitat integrity, depending on the composition and relative abundance of the species present (Weston 1990; Woodin 1991; Simenstad and Fresh 1995; Bruno and Bertness 2001).

In soft-sediment estuaries like Drakes Estero, ecological functions of benthic organisms can include oxygenating sediments by burrowing, consuming and reworking detritus (nonliving organic matter) into forms usable for other species, irrigating sediment and promoting structural complexity within the soft substrate, resuspending sediments and nutrients through bioturbation (the stirring or mixing of sediment by living organisms), and influencing nutrient cycles (Trianni 1995; Bruno and Bertness 2001; Dumbauld, Brooks, and Posey 2001; Welsh 2003; Ferraro and Cole 2007). Studies on benthic fauna in west coast estuaries have shown that the ecosystem functions of the benthic community can be adversely affected by disturbances related to organic enrichment (Weston 1990; Dumbauld, Ruesink, and Rumrill 2009); use of pesticides (such as carbaryl used to control burrowing shrimp) or other activities related to shellfish mariculture (Simenstad and Fresh 1995; Trianni 1995; Dumbauld, Brooks, and Posey 2001); and physical disturbance due to dredging, diking, boat traffic, or the introduction of invasive species (Ferraro and Cole 2007; Thompson 2005; Dumbauld, Ruesink, and Rumrill 2009).

Dominant native filter feeders include bivalves such as *Nutricola* spp., Washington clams (*Saxidomus nuttalli*), and gaper clams (*Tresus capax*). In addition, macoma clams are found in the outer, sandy tidal flats of Drakes Estero. Other dominant benthic species include tanaid crustaceans (*Leptochelia dubia*), cumaceans (*Cumella vulgaris*), phoronids (*Phoronopsis viridis*), shore crabs (*Hemigrapsus oregonensis*), gammarid amphipods, polychaete worms, and ostracods (Press 2005).

Bivalves

Bivalves, such as native clams, represent a major component of the benthic faunal community in Drakes Estero. Press (2005) noted eight different species of clams (*Clinocardium nuttalli*, *Macoma nasuta*, *M. petalum*, *M. secta*, *Nutricola confusa*, *Protothaca staminea*, *Gemma gemma* [nonnative], *Rochefortia tumida*) and one species of mussel (*Musculista senhousia* [nonnative]) in plots at the mouth of Barries Bay. In addition, native marine clams (*N. confusa*, *N. tantilla*) were prevalent in the study plots of Harbin-Ireland (2004^{xviii}) in Schooner Bay. Nonnative species, such as the Pacific oyster (*Crassostrea gigas*) and the Manila clam (*Ruditapes philippinarum*), are culture species introduced by the commercial shellfish operations that represent a large component of the bivalve population in Drakes Estero (see discussion below).

Bivalves are filter feeders, with the capacity to contribute to the cycling of nutrients and organic matter between the bottom substrate (benthic system) and the overlying water column (pelagic system) (Dame 1996). With respect to bivalves, nutrient cycling relates to the manner in which these filter feeders remove particulate organic and inorganic matter (including plankton) from the water column and, through the process of digestion and excretion, convert that material into forms that are more readily available for uptake by other organisms inhabiting the bottom substrate (Lenihan and Micheli 2001) (see discussion under “Biogeochemical Cycling” above). In various ecosystems, nutrient cycling influenced by filter-feeding bivalves has been shown to provide ecological benefits such as reduced turbidity (Newell and Koch 2004), depression of harmful algal blooms (Dame and Prins 1998; Smaal, van Stralen, and Schuiling 2001), and stimulation of primary productivity through nutrient enrichment of nearby sediments where algae and/or submerged aquatic vegetation may be growing (Reusch, Chapman, and Gröger 1994; Peterson and Heck 1999, 2001; Newell and Koch 2004). However, the research of Dumbauld, Ruesink, and Rumrill (2009) suggests that smaller west coast estuaries like Drakes Estero are unlikely to experience most of these broad ecosystem-level influences from bivalves to any large degree due to factors such as extensive tidal flushing, high nutrient content in the sediments, and proximity to nutrient-rich upwelling zones along the coast. Dumbauld, Ruesink, and Rumrill (2009) suggest that the abundant nutrient supply from upwelling controls summer primary productivity in smaller west coast embayments like Drakes Estero. Under these conditions, ecosystem benefits from filter-feeding bivalves would be more likely to function at local scales (i.e., under or immediately adjacent to shellfish beds and structures) rather than at larger scales (Dumbauld, Ruesink, and Rumrill 2009).

The Olympia oyster (*Ostrea lurida*) is a species that is native to the Pacific coast of North America (Couch and Hassler 1989; Baker 1995). The history of the decline of the native Olympia oyster within its original range is believed to be one of overexploitation. By the early 1900s, populations of this species were so depleted due to overfishing that the fishery was abandoned altogether following the successful introduction of the nonnative Pacific oyster. A recent study shows that the native Olympia oyster suffers ecological displacement from the Pacific oyster, a much more successful competitor (Trimble, Ruesink, and Dumbauld 2009). Inspections during the 1930s, as documented by Bonnot (1935), found no Olympia oysters growing in Drakes Estero. As Bonnot (1935) states: “No oysters were found growing there. Several small plants of Japanese seed oysters were made in 1932.” The historic presence of Olympia oysters in Drakes Estero has also been the subject of recent archeological work (Konzak and Praetzellis 2011; Babalis 2011), which found that Olympia oysters were of limited distribution in Drakes Estero even prior to the advent of large-scale commercial fishing on the California coast. This was attributed to lack of hard substrates in the estero which serve as natural attachment sites for Olympia oysters (Konzak and Praetzellis 2011).

Among documented environmental changes that are occurring on the Pacific coast, little is known about the potential effects of climate change, and associated physical/chemical ocean changes, on bivalve populations. However, it should be noted that recent data suggest that the California coast is undergoing sea-level rise from climate change (Heberger et al. 2009). In addition to changes in sea level, climatic warming has also been linked to changes in ocean circulation patterns and water chemistry. Scientists have recently documented changes in ocean pH levels, indicating that ocean acidification is a process that is currently occurring and can be measured in coastal marine and estuarine habitats (Feely et al. 2008; Kerr 2010). Ocean acidification (a condition in which seawater becomes more acidic) can have adverse effects on organisms that build shells or skeletons from calcium carbonate, such as marine bivalves (Kerr 2010; Gaylord et al. 2011; Barton et al. 2012). The more acidic conditions can cause reduced rates of

calcification (effectively lowering shell-building potential), and eventually can begin to dissolve shell material (Feely et al. 2008; Kerr 2010).

Nonnative, Invasive, and Commercial Shellfish Species

The Pacific oyster, which is the species of oyster cultivated by DBOC, is not native to the west coast of North America (Ruesink et al. 2005). As such, there is potential for this species to develop naturally breeding populations in Drakes Estero. A recent publication from the San Francisco Estuary Institute (SFEI) identifies the Pacific oyster as an invasive species in San Francisco Bay, and establishes priorities for removal of this species (San Francisco Bay Joint Venture Science Subcommittee 2011). The Pacific oyster has been observed growing independent of culture stock in Tomales Bay and Drakes Estero (Grosholz 2011b).

Current BMPs in commercial shellfish operations, such as use of triploid stock (effectively sterile stock, with three sets of chromosomes rather than two) to inhibit establishment of reproductively active colonies, along with importation of cultchless juveniles (young molluscs without large shells), are measures used in other areas of the country to deter colonies of nonnative shellfish (NAS 2004). The stock cultured by DBOC is diploid, which carries a higher risk of naturalization than triploid stock. Based on reports submitted to CDFG, DBOC records indicate average production levels of nearly 5.34 million Pacific oysters (approximately 454,036 pounds) harvested annually between 2007 and 2009. Annual production has ranged from approximately 4.15 million Pacific oysters (352,960 pounds) harvested in 2006 to approximately 7.28 million Pacific oysters (618,375 pounds) in 2011. The greatest annual amount of Manila clams produced by DBOC is 20,520 Manila clams (684 pounds) in 2010.

Manila clam (*Venerupis philippinarum*), native to the Indo-Pacific region, is now widely distributed along the Pacific coast of the U.S. due to human introductions (Humphreys et al. 2007). As described in chapter 1 (“Commercial Shellfish Operations in Drakes Estero”) and chapter 2 (“Special Use Permit Area and Mariculture Species”), Manila clams were originally added to JOC Lease M-438-02 in 1993 but there is no record of Manila clam harvest until 2009. CFGC amended the lease in 2009 to expand cultivation of this species to Lease M-438-01, though the expansion was not authorized by NPS. DBOC reported planting 1 million Manila clam seeds in bottom bags in 2006, and also harvesting Manila clams in 2009, 2010, and 2011. A reproductive population of the Manila clam has recently been found growing independent of culture stock in Drakes Estero (Grosholz 2011b).

Finally, the purple-hinged rock scallop (*Hinnites multirugosus*), a species native to the region, has been cultivated historically in Drakes Estero. As discussed in Chapter 1 (“Commercial Shellfish Operations in Drakes Estero”) and Chapter 2 (“Special Use Permit Area and Mariculture Species”), JOC originally was approved for purple-hinged rock scallop under Lease M-438-02 in 1979. At the time this lease was issued, CDFG noted that purple-hinged rock scallops “do not occur naturally within the biota of the lease area” (CDFG 1979b). According to tax records, purple-hinged rock scallops have never been sold by DBOC. The last record of scallops being harvested at this site was from May 1994 (CDFG 2011c). Because purple-hinged rock scallops have a hard-surface attachment requirement (Kozloff 1983), natural habitat (i.e., outside of artificial habitat associated with cultivation) within Drakes Estero is not abundant for this species.

NAS (2009, 2010) points out that historic importation of the Pacific oyster on cultch has resulted in the introduction of other nonnative species to the region (see also Foss et al. 2007), such as the pathogen

Haplosporidium nelsoni (which causes MSX-multinucleated sphere unknown) (Friedman 1996; Burreson and Ford 2004) and herpes-like viruses (Burge et al. 2005; Burge, Griffin, and Friedman 2006; Friedman 1996). Currently, CDFG regulates DBOC's operation with respect to the stocking of aquatic organisms, brood stock acquisition, disease control, importation of aquatic organisms into the state, and the transfer of organisms between waterbodies.

In addition, the types of structures utilized in shellfish mariculture provide points of colonization for the invasive colonial tunicate *Didemnum vexillum* (commonly referred to as *Didemnum*) (Lambert 2009; Foss et al. 2007). This tunicate is an aggressive colonizer of hard substrates, and has been observed overgrowing habitats such as piers, pilings, rocky surfaces, and the types of structures used in oyster mariculture (racks, bags, etc.). This type of aggressive growth can cause serious ecological consequences for invertebrate fauna (Osman and Whitlatch 2007; Mercer, Whitlatch, and Osman 2009). Further, the ability of *Didemnum* to regenerate after being fragmented increases its dispersal capabilities (Bullard, Sedlack, et al. 2007), which can be exacerbated by maintenance of oyster bags and racks (NAS 2009). In Drakes Estero as well as nearby Tomales Bay, this tunicate has been observed growing on eelgrass blades (NAS 2009; Grosholz 2011b). Tunicate overgrowth can have detrimental effects on eelgrass by inhibiting its ability to photosynthesize (Carman and Grunden 2010). Finally, Heiman (2006) looked at the potential effects of human-made hard substrates (piers, jetties, bridges) on nonnative invertebrate and algae introductions in nearby Elkhorn Slough, California, drawing a connection between oyster culture as a mode of introduction for nonnative species and increased availability of hard substrates for nonnative species to become established.



Didemnum growing on eelgrass, as observed in Tomales Bay. (Photo courtesy of NPS.)



Didemnum at Bull Point, along the shore of Drakes Estero. (Photo courtesy of NPS.)

Byers (1999) studied the invasion of a nonnative mud snail (*Batillaria attramentaria*), making specific reference to JOC, the previous oyster operator in Drakes Estero. This organism was found to be detrimental to native snail populations, a point that was noted in the recent NAS study of mariculture effects in Drakes Estero (NAS 2009). In addition, shell remains from a nonnative soft shell clam (*Mya arenaria*) were observed by archeologists and marine biologists on the surface of archeology site MRN-296 near DBOC onshore facilities, located in an area formerly used as a shell dumping site for JOC (Konzak and Praetzellis 2011).

FISH

Drakes Estero has been identified as essential fish habitat for fish species managed under several fishery management plans maintained by the Pacific Fishery Management Council (PFMC 2008). The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267), is the law that governs U.S. marine fisheries management. It requires regional management councils to maintain fishery management plans that, among other things, describe essential fish habitat and protection measures. Species included under these fishery management plans include various rockfishes, flatfishes, and sharks (The Pacific Coast Groundfish Fishery Management Plan), the coho and Chinook salmon (Pacific Coast Salmon Fishery Management Plan), and northern anchovy, mackerel, and squid (Coastal Pelagic Fishery Management Plan) (PFMC 1998). The topic of essential fish habitat was discussed under the “Impact Topic: Eelgrass” section above.

Based on studies in other U.S. Pacific estuaries and coastal lagoons, Drakes Estero likely supports a wide diversity of fish species. For example, common species found in Pacific estuaries include starry flounder (*Platichthys stellatus*), English sole (*Parophrys vetulus*), herring (*Clupea pallasii*), anchovy (*Engraulis mordax*), speckled sand dab (*Citharichthys stigmaeus*), surf smelt (*Hypomesus pretiosus*), American shad (*Alosa sapidissima*), staghorn sculpin (*Leptocottus armatus*), shiner surfperch (*Cymatogaster aggregata*), and free-swimming arthropods such as the Dungeness crab (*Cancer magister*) (Pinnix et al. 2005; Blackmon, Wyllie-Echeverria, and Shafer 2006; Williamson 2006). A comprehensive study of the fish community within Drakes Estero has not been undertaken; however, Wechsler (2004^{xxix}) sampled fish in Schooner Bay and Estero de Limantour to evaluate potential effects of oyster mariculture on Drakes Estero fish populations. Capture methods at sampling stations included the use of three replicate trawl net samples, as well as supplemental sampling using gill nets and minnow traps.

Wechsler (2004^{xxx}) used data from the catch of 2,816 individual fish and 29 species in the analysis of fish communities in Drakes Estero and Estero de Limantour. The fish capture results were evaluated in a number of ways, including by their ecological guild (i.e. a group of species that use the same resource). The total catch was divided into five ecological guilds, including schooling planktivores (i.e., feeding primarily on plankton), structure feeders, benthic-oriented feeders, crevice dwellers, and eelgrass dependent feeders. The presence of oyster racks did not greatly alter the number of species in each guild, but an effect on the number of total fish observed within each guild was observed (Wechsler 2004^{xxxi}).

The five most prevalent species were topsmelt (*Atherinopsis affinis*), three-spined stickleback (*Gasterosteus aculeatus*), staghorn sculpin (*Leptocottus armatus*), bay pipefish (*Syngnathus leptorhynchus*), and kelp surfperch (*Brachyistius frenatus*), which together accounted for approximately 89 percent of the total number of individuals observed in the study (Wechsler 2004^{xxxii}). Wechsler (2004^{xxxiii}) concluded that these five species are likely permanent residents in Drakes Estero. Aside from these species, Wechsler (2004^{xxxiv}) found six species of intermediate abundance (10-100 individuals) and 18 species of low abundance (less than 10 individuals).

Three of the 29 species (approximately 10 percent) used for analysis by Wechsler (2004^{xxxv}) are currently listed in the The Pacific Coast Groundfish Fishery Management Plan (PFMC 2008), including leopard shark (*Triakis semifasciata*), starry flounder (*Platichthys stellatus*), and cabezon (*Scorpaenichthys marmoratus*). Two other included on this management plan were observed during the study; however, butter sole (*Isopsetta isolepis*) was located in reference samples within Estero de Limantour and lingcod (*Ophiodon elongates*) were part a fish collection not included in the Wechsler (2004^{xxxvi}) study. The study

also reported a single northern anchovy (*Engraulis mordax*) (Wechsler 2004^{xxvii}), which is one of the five species within the Coastal Pelagic Fishery Management Plan (PFMC 1998). The remaining 23 of the 29 species observed by Wechsler in 2004 are not listed within fishery management plans maintained by the Pacific Fishery Management Council. As such, Drakes Estero is not designated as essential fish habitat for these species.

HARBOR SEALS

Drakes Estero supports a large breeding population of Pacific harbor seals (*Phoca vitulina richardsi*) due in part to the diversity and availability of exposed substrates such as intertidal sandbars, mudflats, and beaches, which are favorable locations for seal haul-out sites (NAS 2009; Becker, Press, and Allen 2011) (figure 3-5). Drakes Estero is one of the largest harbor seal colonies in the state (Lowry, Carretta, and Forney 2008), the largest in Marin County, and accounts for around 20 percent of pups produced in central California from Sonoma to San Mateo Counties (Codde et al. 2011).

The Pacific harbor seal is the only year-round resident pinniped (seal or seal-like mammal) in the San Francisco Bay Area (Sydeman and Allen 1999; Truchinski et al. 2008). Seals use terrestrial sites (called haul-out sites) during the breeding season (March 1 to June 30) to give birth and suckle their young, and during the nonbreeding season for rest and to molt their fur (NAS 2009). Harbor seals reside almost exclusively in coastal habitats, spending approximately 33 to 55 percent of their time at onshore terrestrial sites depending on the season (Yochem et al. 1987; Burns 2002; NAS 2009). Seal abundance at haul-outs is influenced by multiple factors, including time of day, tide level, current direction, weather, season, year, disease outbreaks, disturbances from other wildlife, and human activities (Yochem et al. 1987; Suryan and Harvey 1999; Thompson, Van Parijs, and Kovacs 2001; Grigg et al. 2004; Hayward et al. 2005; Seuront and Prinzevalli 2005; NAS 2009).

Environmental factors such as El Niño–Southern Oscillation events can affect attendance and reproduction (Trillmich and Ono 1991; Sydeman and Allen 1999) due to the changes in weather patterns and ocean temperatures that usually accompany this Pacific Ocean phenomenon. Other factors include density-dependence (Jeffries et al. 2003), interspecific competition (competition with other species) (Bowen et al. 2003), predation (Lucas and Stobo 2000), and disease (Thompson, Van Parijs, and Kovacs 2001). Human activities can disturb seals at haul-out sites, causing changes in seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzevalli 2005; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011).

Figure 3-5 shows the sandbar areas in Drakes Estero used by harbor seals, as well as the boundaries of the current zones designed to protect common haul-out sites. Drakes Estero is a site of ongoing pinniped monitoring studies conducted by NPS as part of the San Francisco Bay Area Network Inventory and Monitoring Program (e.g., NPS 2006c; Adams et al. 2009; Codde et al. 2011). Monitoring objectives of this program include: 1) determining long-term trends in annual population size and annual and seasonal distribution; 2) determining long-term trends in reproductive success through annual estimates of productivity; 3) identifying potential or existing threats (i.e. climate change, human disturbance, pollutants), and estimating degree of threat at known seal haul outs in order to guide management; and, 4) participating with the NMFS national stranding network to further document distribution, occurrence, and

health of all pinnipeds (and other marine mammals). Monitoring protocols include bi-weekly surveys of colony sites during breeding seasons, and bi-monthly surveys at Point Reyes Headlands year-round.

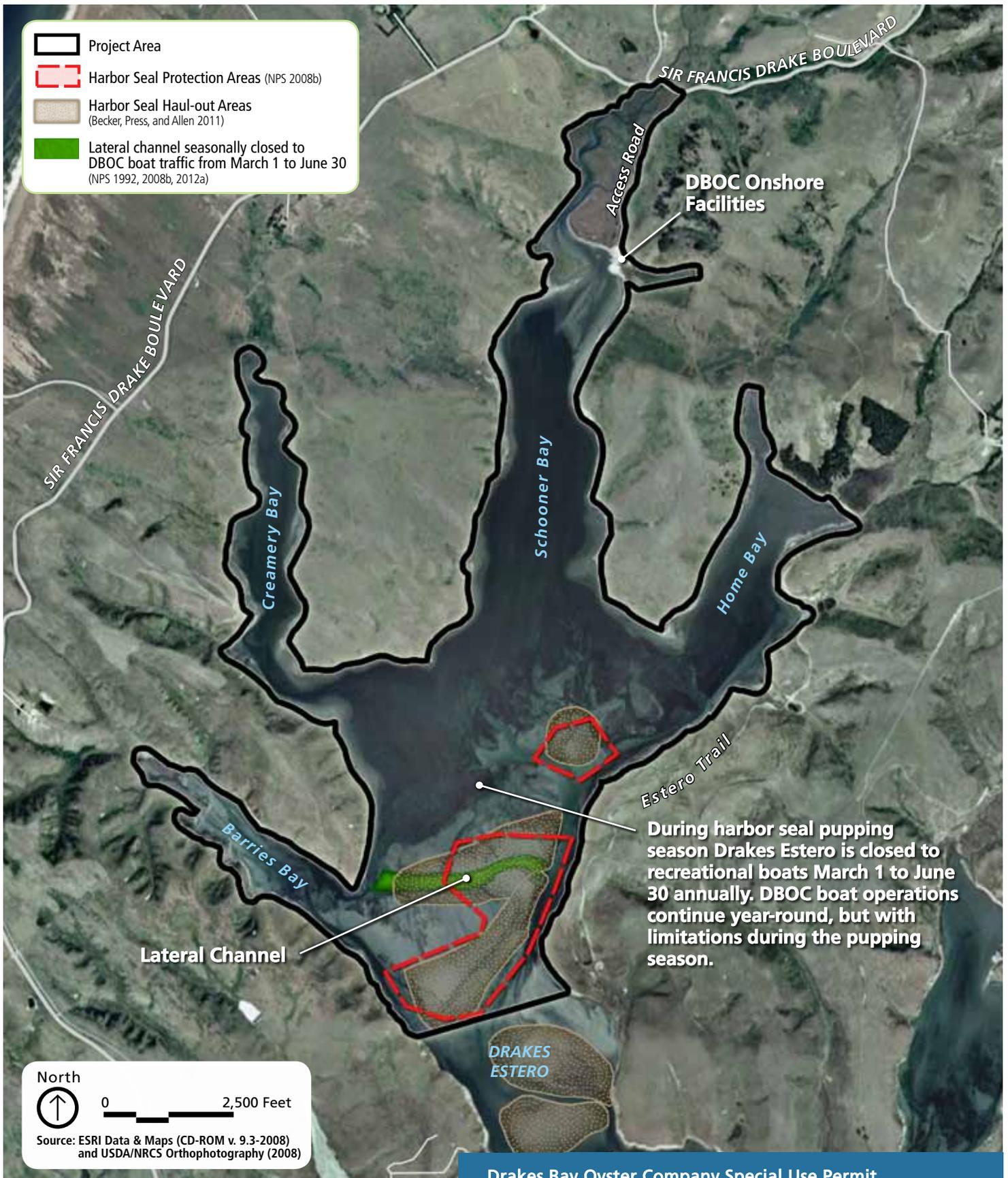
Population size and reproductive success of harbor seals can be attributed to a number of factors, one of which is the availability of high quality breeding habitat. The results of the 2010 NPS study of harbor seals in multiple Marin County survey locations indicated that the largest seal population, based on observed numbers of hauled-out adults (610) and pups born (223), is within Drakes Estero (Codde et al. 2011). In 2011, 715 adults and 364 pups were observed in Drakes Estero (Codde et al. 2012).

Haul-out sites in Drakes Estero and adjacent Estero de Limantour have been divided into eight subsites based on habitat conditions. These subsites arise from a complex of eight sandbar sites where seals haul out at various times over the year. During a single day, seals can move from one subsite to another when crowding occurs or when rising tides limit the amount of available space. Seals also may float over submerged subsites during high tides, awaiting the reemergence of the sandbar when the tide recedes. The eight subsites in Drakes Estero and Estero de Limantour are used during breeding and molting seasons, and some also are used year-round. Females with pups frequent sandbars located in the upper and middle portions of Drakes Estero during low tide, which apparently provides the advantage of isolation from the mainland, as well as from humans and predators. Limantour Spit at the mouth of Drakes Estero is predominantly used by non-breeding seals during the breeding season (Becker, Press, and Allen 2011).

In July 2009, the MMC initiated a review of the potential effects of human activities, including aquaculture operations, on harbor seals in Drakes Estero. The study was concluded in 2011, and the results of this review are provided in the MMC report, *Mariculture and Harbor Seals in Drakes Estero, California* (2011b) (see also discussion under chapter 1). A more detailed discussion of MMC findings is presented under the impact topic “Wildlife and Wildlife Habitat: Harbor Seals” in chapter 4.

Between spring 2007 and spring 2010 more than 250,000 digital photographs were taken from remotely deployed cameras overlooking harbor seal haul-out areas in Drakes Estero. The photographs were taken at one minute intervals. These photographs are posted on the NPS web site at http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_videos.htm

In response to public comments, the NPS initiated a third-party review of the photographs with the US Geological Survey, in consultation with a harbor seal specialist with the Hubbs-Sea World Research Institute. The USGS assessment focused on the 2008 harbor seal pupping season, when more than 165,000 photos were collected from two sites overlooking Drakes Estero between March 14, 2008 and June 23, 2008. The results of this review are provided in the USGS report, *Assessment of photographs from wildlife monitoring cameras in Drakes Estero, Point Reyes National Seashore* (Lellis et al. 2012) (see also discussion under chapter 1). A more detailed discussion of the USGS assessment is presented under the impact topic “Wildlife and Wildlife Habitat: Harbor Seals” in chapter 4.



Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

**FIGURE 3-5
Harbor Seal Protection Areas and Haul-out Areas**

BIRDS

The region surrounding Point Reyes Peninsula is host to one of the most diverse and abundant bird population centers in the world (Shuford et al. 1989). In particular, the Seashore is a well known location for abundant waterbird and shorebird populations, which include a large variety of species that rely on its coastal and estuarine habitats. There are several reasons for such high diversity, including coastal upwelling, which provides for rich, nearshore feeding grounds with abundant zooplankton and small fishes; the physiographic character of the landscape, which provides exceptional nesting habitat for many species; the position of the region as a stop-off point for migrating birds from temperate areas such as Chile, New Zealand, Hawaii, and other locations; and the proximity of deep water close to the shoals near Cordell Bank, which creates unique conditions for high productivity and optimal foraging (or feeding) for waterbirds and shorebirds (Shuford et al. 1989; Press 2005).

Foraging is an important aspect of a bird's biological activity, involving energy expenditure related to finding food and energy gained from successful feeding activity. Since shorebirds spend most of their life away from breeding grounds (Warnock, Page, and Sandercock 1997), shorebird use of foraging habitat is an essential aspect component of normal biological activity and can indirectly affect long-term population dynamics. Drake Estero is a major foraging and resting location for nearly all species of resident (year-round) and nonresident (migratory) birds known to use the project area (Shuford et al. 1989).

In general, due to the large number of migratory species using Drakes Estero, populations vary depending on the time of year that they migrate (usually spring or fall) (Evens 2008). Shuford et al. (1989) used the following categories to describe seasonal occurrence of birds visiting or inhabiting the Seashore, including Drakes Estero: "resident," which includes species present continuously through the nonmigratory period; "transient," a species passing through the area during migration; "dispersant," which includes species that arrive after long-distance dispersal from some other breeding site; and "visitant," a species occurring occasionally because it is at the edge of its normal range.

While transient, dispersant, and visitant bird species use Drakes Estero to temporarily stop and forage during migration, many also overwinter (stay and forage throughout the winter season) before continuing to their final migratory destination. For some species, Drakes Estero is their migratory destination. The invertebrate species living year-round on intertidal flats in Drakes Estero are available prey for the overwintering bird species, as well as those species that visit during the spring and fall migrations. In addition, other abundant prey species which live and seek cover in eelgrass beds (e.g., fish and crustaceans) provide foraging opportunities for the bird population.

The abundance and diversity of birds that overwinter is reflected by the inventories conducted in Drakes Estero by White (1999), in which 58 waterbird and shorebird species were recorded in Home Bay from November to March. In addition, the study recorded bird inventories during the same period in other Drakes Estero locations, revealing 51 species in Schooner Bay, 47 species in Creamery Bay, and 41 species in Barries Bay (White 1999). The combined inventories from each location totaled approximately 73 different species during the mid-winter count (White 1999; appendix E). The highest abundance included the American wigeon (*Anas americana*), bufflehead (*Bucephala albeola*), ruddy duck (*Oxyura jamaicensis*), willet (*Catoptrophorus semipalmatus*), western sandpiper (*Calidris mauri*), least sandpiper (*C. minutilla*), and dunlin (*C. alpina*). Similar levels of bird abundance and diversity to those recorded in Drakes Estero is noted in other nearby lagoons. White (1999) reports data from Bolinas Lagoon and Abbott's Lagoon, showing a total of 74 and 60 different bird species at each location, respectively. This highlights the value of these habitats to attract and support a large variety of waterbird and shorebird species.

Other species that frequent Drakes Estero include osprey, (*Pandion haliaetus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), and black-crowned night heron (*Nycticorax nycticorax*) (Shuford et al. 1989). Osprey are raptors attracted to Drakes Estero's abundant fish population, the osprey's preferred prey, and can select nesting sites in nearby trees and cliffs (Evens 2008). Herons and egrets are types of colonial waterbirds, species which gather into large assemblages during nesting season and obtain their food by foraging in nearby aquatic habitat. Studies conducted between 1999 and 2005 by Kelly et al (2006) present data from an active colony of great blue herons and great egrets, located on the west shore of Drakes Estero. Earlier inventories of Marin County colonial waterbirds also found great blue heron colonies near the south finger of Home Bay, and on the east and west shore of Schooner Bay near the former Johnson Oyster Company (Pratt 1983).

In total, approximately 102 species of migratory waterbirds, shorebirds, and waterfowl have been recorded in the Drakes Estero and Estero de Limantour complex (Evens 2008). The primary bird occurrences in the project area result from high frequency of resident and overwintering (transient) species using Drakes Estero as foraging habitat, staging habitat, and habitat to rest before and after migration. The Southern Pacific Region as a whole, which includes the Seashore and Drakes Estero, provides important wintering habitat for shorebirds that breed in both the arctic and temperate zones (Hickey et al. 2003). These include a high diversity of species, including waterbirds, shorebirds, and waterfowl (Shuford et al. 1989).

Drakes Estero's specific importance as a wintering habitat is linked to the abundant foraging and resting habitat (intertidal beaches and flats, brackish marshland, and open subtidal waters), an attribute which attracts large quantities of birds (Shuford et al. 1989). Further, shorebird wintering habitat in Drakes Estero is improved by the relative isolation of intertidal habitat areas from the surrounding terrestrial environment, reducing the threat of predation. Birds rely heavily on auditory cues (e.g., the call of a raptor) during biological activities and for detection of predator alerts or warning signals from other nearby birds (Francis, Ortega, and Cruz 2009). Since more birds are attracted to isolated foraging and resting habitat, predators are more likely to be detected and avoided with alerts and warning signals.

The importance of foraging and resting habitat for migratory birds in Drakes Estero also relates to their use as "staging sites." These sites are needed in order for migratory birds to restore depleted fat reserves after long periods of flight (Myers 1983), and to improve their physical condition as they travel toward breeding grounds (Ganter 2000). By providing feeding and resting habitat, staging sites help certain species build energy reserves required for successful breeding activity at a bird's migratory destination (Harrington and Perry 1995), and can allow birds to arrive on breeding grounds in good condition (Ward et al. 1997). The use of Drakes Estero as a staging site for some species is enhanced by the presence of sandspits and sandbars, which in addition to serving as foraging habitat, provide isolated roosting and resting habitat.

Other species, such as Pacific black brant geese (*Branta bernicla*), utilize Drakes Estero as a staging site in large part due to its abundant eelgrass beds that provide highly productive foraging habitat. In particular, brant rely on eelgrass as their principle food source during migration (Davis and Deuel 2008), grazing by the hundreds on eelgrass beds before continuing spring and fall migration between Mexico and Alaska (Shuford et al. 1989; Ganter 2000; Moore et al. 2004; Evens 2008). Since they do not dive, brant usually only access eelgrass habitat at low tide. Other foraging preferences include selection of the deepest areas permitted by tides and selection of eelgrass beds close proximity to large tidal channels (Davis and Deuel 2008), like those found in Drakes Estero, where there is higher eelgrass density.

Further, brant prefer to feed in areas that are also close to “gritting” sites, such as unvegetated intertidal areas (like mud flats) (Davis and Deuel 2008). Brant must ingest grit in order to digest food, and can use preferred gritting sites repeatedly (Lee et al. 2004). During high tide, brant require protected open water or beaches that can be used for resting and loafing (Davis and Deuel 2008).

Even when all requirements are present in a selected staging site, the brant’s reliance on eelgrass can limit their overall foraging success if the quality of eelgrass habitat is degraded (Davis and Deuel 2008). To this end, quality of eelgrass habitat would be more critical during spring migration, when the brant are flying north toward their Arctic breeding grounds. The migratory patterns displayed by brant reveal that spring migration differs from fall migration in terms of overall duration and habitat use. Spring-migrating brant generally make shorter flights and revisit staging sites used in the fall (Pacific Flyway Council 2002). This relates to their need to achieve good physical condition upon departure from temperate staging sites, which in turn increases the likelihood for successful reproduction upon reaching Arctic breeding grounds (Ganter 2000).

The Pacific Flyway Management Plan for Pacific Populations of Brant (2002) states that migratory use of Drakes Estero historically averaged 25,000 individual per year; however, current brant populations recorded in Drakes Estero range from 1-3,000 per year (Pacific Flyway Council 2002). The brant winter at Drakes Estero to a lesser degree, with average densities reported as less than 100 individuals per year (Pacific Flyway Council 2002). Due to decreasing abundance within their historic range, the Pacific black brant is considered by CDFG as a Bird Species of Special Concern, priority 2 (Davis and Deuel 2008). The priority 2 category is assigned to a “Population or range size greatly reduced or population or range size moderately reduced and threats projected to greatly reduce the taxon’s population in California in the next 20 years” (Shuford and Gardali 2008) Brant are sensitive to a variety of human activities and responses to stimuli range from “brief alert behaviors to immediate departure from a site” (Pacific Flyway Council 2002).

The American white pelican (*Pelecanus erythrorhynchos*) is also found in Drakes Estero during summer and winter months (Evens 2008). Like the brant, this pelican species is a CDFG Bird Species of Special Concern within its current breeding range (which is outside Drakes Estero) (Shuford 2008). However, Drakes Estero provides rich foraging habitat preferred by overwintering white pelicans, which can utilize the estuary during the non-breeding period of migration (Shuford 2008). The pelican also utilizes the isolated upper and tidal flats of Drakes Estero as resting habitat.

Drakes Estero also provides habitat for several bird species recently removed from the federal list of Endangered and Threatened Wildlife. These include the brown pelican (*Pelecanus occidentalis*), peregrine falcon (*Falco peregrinus*), and bald eagle (*Haliaeetus leucocephalus*). Abundant numbers (ranging into thousands of individuals) of brown pelicans forage and roost in Drakes Estero, especially during runs of anchovies and sardines (Evens 2008). Peregrine falcons residing in nearby cliffs also hunt prey in Drakes Estero, likely due to the availability of abundant avian prey species, which is most of the falcon’s diet (Evens 2008). Unlike the peregrine, bald eagles are not known to nest near Drakes Estero, but can occasionally forage in its waters for fish and other birds.

Due to the abundance and diversity birds that inhabit and use Drakes Estero, the estuary receives recognition from multiple bird conservation initiatives. In general, recent efforts in North America to advance bird conservation are incorporated into five major bird conservation initiatives (Shuford 2011): 1) the North American Waterfowl Management Plan; 2) Canadian and U.S. shorebird conservation plans; 3) Partners in Flight; 4) the North American Waterbird Conservation Plan; and 5) the North American

Bird Conservation Initiative. Further, the Marine Life Protection Act (MLPA) Initiative is designed to help implement MLPA requirements to protect or conserve marine life and habitat

Of these, the 2003 Southern Pacific Shorebird Conservation Plan (part of the U.S. Shorebird Conservation Plan) designates Drakes Estero, in combination with Estero de Limantour, as a wetland of importance. It states, “Each regularly holds thousands of shorebirds with combined totals sometimes reaching nearly 20,000 individuals in winter” (Hickey et al. 2003). The conservation plan also notes the Drakes Estero and Estero de Limantour system as a Site of Regional Importance to shorebird conservation by the Western Hemisphere Shorebird Reserve Network (Hickey et al. 2003), a status based on having at least 20,000 shorebirds annually.

Moreover, the system’s proximity to the San Francisco Bay, which is a Western Hemisphere Shorebird Reserve Network Site of Hemispheric Importance (i.e., greater than 500,000 annual shorebirds), and other recognized wetland habitats (Bolinás Lagoon, Tomales Bay, Abbott’s Lagoon, San Antonio Estero, and San Americano Estero) connects it to a network of interrelated coastal wetlands (Harrington and Perry 1995). The Bay hosts more waterbirds and shorebirds in all seasons than any other wetland along the U.S. Pacific coast (Stenzel et al. 2002). The known movements of migratory birds within the greater Bay Area wetland complex are noted in Shuford et al. (1989), also indicating the connectivity of each site within the network of wetlands.

The North American Waterbird Conservation Plan also includes the Seashore as an Important Bird Area (Kushlan et al. 2002). Since this designation, the California chapter of the North American Waterbird Conservation Plan Waterbird Initiative has elevated three divisions of coastal Marin County to independent Important Bird Area status, including Tomales Bay and Outer Point Reyes (the latter inclusive of Drakes Estero and Estero de Limantour). Further, in an assessment of birds on public lands and waters from 2011 the North American Bird Conservation Initiative highlights the critical role of public agencies in bird conservation and stresses needs for increased protection and management (North American Bird Conservation Initiative 2011). It notes that coastal habitats are essential to shorebirds during migration between wintering and breeding habitat, and that designated U.S. Marine Protected Areas by the MLPA are important conservation measures to increase stocks of forage fish for coastal birds (North American Bird Conservation Initiative 2011).

In accordance with Executive Order 13158, NOAA’s National Marine Protected Areas Center partners with local, tribal, state, and federal governments to implement various levels of conservation and protection within over 1,600 MPAs. The Seashore is included as a federal MPA, with a protection level defined as “uniform multiple use.” This level of protection affords certain allowable activities or restrictions throughout the protected area. Drakes Estero has the same level of protection and is included in the Drake Estero State Marine Conservation Area (NPS 2012b). Two other MPAs border Drakes Estero, the Estero de Limantour State Marine Reserve and the Point Reyes State Marine Reserve (NPS 2012b). Both of these MPAs have a protection level of “no take.” This higher level of protection prohibits the extraction or destruction of natural and cultural resources. Another MPA, the Point Reyes Headlands Special Closure, prohibits access and use of a 1,000-foot zone south of the Point Reyes Headlands (NPS 2012b) to protect birds and bird habitat.

Other bird conservation efforts are addressed by the Pacific Flyway Council, which provides management plans for multiple bird species that migrate within the Pacific Flyway, including black brant geese. In the Pacific Flyway Management Plan for Brant, the Pacific Flyway Council recognizes the need for

additional conservation measures to adequately protect primary brant staging and wintering sites from coastal development and associated disturbance (Pacific Flyway Council 2002). Of the top priorities listed for future habitat management, the plan recommends the “continued protection of critical habitats and encourages the pursuit of mitigation for impacts, including loss or degradation of eelgrass beds, grit and loafing sites, disturbance of wintering flocks, and exclusion of brant from traditional use sites” (Pacific Flyway Council 2002).

Non-governmental agencies also provide conservation initiatives and plans that recognize the importance of the Drakes Estero bird habitat. The National Audubon Society listed “Point Reyes-Outer”, which includes Drakes Estero, as an Important Bird Area (IBA) of global priority (National Audubon Society 2012a). The National Audubon Society (National Audubon Society 2012b) states that the areas of the Point Reyes-Outer IBA most important to bird conservation include the saltmarsh and mudflat habitats of Drakes Estero. In addition, the American Bird Conservancy has maintained a separate Important Bird Area program and in 2001 listed the Seashore as one of the 100 Globally Important Bird Areas. Contributions from these private organizations, in addition to those from several government agencies (like USFWS) and the aforementioned bird initiatives, comprise an important element of the bird conservation coalition established by the U.S. North American Bird Conservation Initiative.

IMPACT TOPIC: SPECIAL-STATUS SPECIES

Special-status species include plant and animal species that have regulatory protection under current federal and state laws. Federal protection is afforded through the ESA, which is administered by USFWS and NMFS. In California, state protection is afforded through the California ESA, which is administered by CDFG.

USFWS and NMFS may list a species as either endangered or threatened, and critical habitat areas may be established for currently listed species as an additional conservation measure. By definition, an “endangered” species is in danger of extinction throughout all or a significant portion of its range (NMFS 2011b). A “threatened” species is one that is likely to become endangered in the foreseeable future (NMFS 2011b). Critical habitat is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, on which are found those physical or biological features that are essential to the conservation of the listed species and that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by the species at the time of listing that are essential to the conservation of a listed species (16 U.S.C. 1532). CDFG may list a species as threatened, endangered, or rare. State-listed species with threatened or endangered designations can also be listed federally by USFWS or NMFS and have similar conservation needs. The rare designation describes certain plants in California, not animals, using the California Rare Plant Rank system created by the California Native Plant Society (CNPS). The system ranks the highest conservation priorities for state and federally listed plants, and incrementally lower conservation priorities for unlisted plants (which may still have conservation value but lack sufficient species information or have limited distribution). CNPS Rare Plant Program operates under a Memorandum of Understanding with CDFG, which formalizes and outlines its cooperation in rare plant assessment and protection.

Pursuant to section 7 of the ESA, NPS requested a species list from USFWS to determine whether federally listed threatened or endangered species occur within the project area (appendix E). USFWS

Sacramento Fish and Wildlife Office provided a list of threatened and endangered species for the Drakes Bay U.S. Geological Survey 7.5 Minute Quadrangle Map dated 1976 (USFWS 2010). NOAA's NMFS Southwest Regional Office provided additional comments and recommendations regarding marine resources in Drakes Estero (NMFS 2010c). In addition, NPS reviewed agency consultations (NMFS 2009; USFWS 2004, 2008) for recent NPS projects that address relevant natural resources and are located near Drakes Estero.

To identify potential special-status species specific to the project area of this EIS, NPS reviewed USFWS results by species and associated habitat. NPS determined that none of the federally listed plant species in the USFWS results have potential to be affected by the proposed actions within the project area. Further, NPS determined that seven of the federally listed animal species have potential to exist within the project area. As described in chapter 1, five of the federally listed animal species were dismissed from further analysis in the EIS due to a lack of designated critical habitat in the project/action area, unconfirmed presence of the species in the project/action area, or the potential for less than minor impacts on the species and/or their critical habitat. These include Myrtle's silverspot butterfly, California red-legged frog, leatherback sea turtle, western snowy plover, and California least tern.

The two federally listed animal species retained for detailed analysis in the EIS are described in the sections below. Additional data provided by CDFG and CNPS identified state-listed or other rare or special status species. Based on habitat analysis and survey records, NPS determined that these state-listed and other unlisted rare species would be unaffected by proposed actions in the project area (see appendix E). Therefore, these species were also dismissed from further analysis.

Species described in this section do not comprise all species that are considered to be at risk. "Species of Special Concern" (SSC) are animals that are not listed under state or federal law. The purpose of SSC designation is to focus attention on species that require special management consideration and to help avoid the need for listing under the federal and state endangered species laws. Since these SSC are not listed by USFWS, NMFS, or CDFG, these species are described in the Wildlife and Wildlife Habitat section.

FEDERALLY LISTED ANIMAL SPECIES

Of the 19 federally listed animal species revealed in USFWS searches (appendix E), 2 species are potentially affected by proposed actions in the project area: central California Coho salmon and central California steelhead. These federally listed species are described below.

Central California Coho Salmon Critical Habitat (*Oncorhynchus kisutch*)

The central California Coho salmon was originally listed as federally threatened in 1996 (NOAA 1996) and then changed to federally endangered in 2005 (NMFS 2005b). The salmon was also state-listed as endangered in 2001 (CDFG 2004c). In addition, critical habitat was designated for the Coho salmon in 1999 (NOAA 1999). The Coho salmon is an anadromous species, spending a portion of its life cycle in marine waters (including estuaries) and a portion—specifically spawning and rearing—in fresh waters. Coho salmon adults migrate from their marine environment into the freshwater streams and rivers where they were born, in order to mate and spawn (the release of eggs and sperm after mating). This process

occurs once in the Coho salmon's life cycle, with death occurring after spawning. Upon successful reproduction, young salmon remain in fresh waters for rearing and then migrate to estuarine and marine waters to forage and mature to adulthood (NMFS 2011a).

The threats to the California Coho salmon are numerous. West coast populations have experienced dramatic declines in abundance in the past several decades due to both human-induced and natural factors. Loss of habitat and habitat modification, two primary threats, occur when natural watershed flow regimes are altered by human-induced factors such as diversions for agriculture, flood control, and hydropower, among others. In addition, human land use, such as logging, road construction, and urbanization, causes detrimental habitat modification within the watershed. Recreational and commercial fisheries also threaten the species by altering stock populations. Other threats result from increased predator populations in habitat where modification has caused shifts in nonnative species and predator abundance. Natural threats can include predation from piscivorous birds and pinnipeds, as well as environmental conditions such as flooding and climatic change that can intensify problems associated with riverine and estuarine habitat (NMFS 2011c).

In 2004, the *Recovery Strategy for California Coho Salmon* developed a guide for recovering Coho salmon populations on the north and central coasts of California (CDFG 2004c). For each Coho salmon Evolutionarily Significant Unit (including the central California Coho salmon), several smaller recovery units were created based on the characteristics of smaller drainages within watersheds. The Seashore is included in the Bodega-Marin Coastal Recovery Unit, which is further divided into seven hydrologic areas. Hydrologic areas within the Seashore include Tomales Bay, Point Reyes (which includes Drakes Estero), and Bolinas. Based on the 2004 report, CDFG determined that the Point Reyes hydrologic area does not have Coho salmon present, nor are Coho salmon suspected to be present. The other hydrologic areas within the Seashore have both historical and recently documented occurrences of the species (CDFG 2004c).

However, in association with the federally threatened listing in 1996, NMFS designated critical habitat for central California coast Coho salmon to include all accessible reaches of rivers, including estuarine areas and their tributaries, between Punta Gorda in northern California and the San Lorenzo River in central California (NOAA 1999). This critical habitat designation includes the Seashore, Drakes Estero, and its tributaries. Through this designation, NMFS considers the following requirements of the species: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distribution of a species (NOAA 1999). The designation recognizes species' use of diverse habitats and accentuates the need to account for all of the species' freshwater and estuarine life stages, including small freshwater streams and estuarine rearing areas (NOAA 1999).

Central California Steelhead (*Oncorhynchus mykiss*)

The central California steelhead was listed as federally threatened in 1996 (NOAA 1996). In addition, critical habitat was designated for the steelhead in 2005 (NMFS 2005a). Similar to the Coho salmon, the California steelhead is an anadromous fish species. They swim from freshwater habitat, through estuaries, and into the ocean where they may spend several years before returning to spawn. Monitoring data

indicate that steelhead juveniles may reside within freshwater environments for 18 months to 3 years. The steelhead may make several spawning migrations in its lifetime (NMFS 2011e).

The threats to the California steelhead are numerous, and west coast populations have experienced dramatic declines in abundance in the past several decades (NMFS 2011e). Loss of habitat and habitat modification, two primary threats, occur when natural watershed flow regimes are altered by human-induced factors such as diversions for agriculture, flood control, and hydropower, among others (NMFS 2011c, 2011e). In addition, human land use, such as logging, road construction, and urbanization, causes detrimental habitat modification within the watershed (Avocet Research Associates 2002). In addition, recreational and commercial fisheries also threaten the species by altering stock populations. Other threats result from increased predator populations in habitat where modification has caused shifts in nonnative species and predator abundance (NMFS 2011c, 2011e).

Within the Seashore, the California steelhead occurs in the Olema, Lagunitas, Pine Gulch Creek, Tomales Bay, Drakes Estero, and Bolinas watersheds. Data on steelhead populations have been gathered as part of the NPS *Coho and Steelhead Monitoring Program* (NPS 2001a), and since the mid-1990s, monitoring efforts show that populations of steelhead are generally stable. Within the Drakes Estero watershed, which also is recognized by NMFS as potential steelhead habitat, creeks known to support California steelhead include East and North Schooner, Glenbrook, Muddy Hollow, Home Ranch, and Laguna. As part of the 2008 Drakes Estero Coastal Watershed Restoration Project, the NPS, restored or enhanced fish passage at six sites within the Drakes Estero watershed (NPS 2009a).

In association with the federally threatened listing in 1997, NOAA designated critical habitat for central California coast steelhead in 2005 (NMFS 2005a). The critical habitat area includes portions of Marin County, the Seashore, and the Drakes Estero watershed. Drakes Estero itself is not included in the critical habitat designation; however, several tributary creeks feeding Drakes Estero have segments of critical habitat in the vicinity of the project area. These creeks include Creamery Bay, East Schooner, Home Ranch, Laguna, and Muddy Hollow (NMFS 2005a). While the designated critical habitat in these creeks is close to Drakes Estero, location coordinates of the upstream and downstream limits provided by NMFS show that they are not included in the project area (NMFS 2005a).

Animal Species of Concern

Several federal species of concern and state-listed rare, threatened, or endangered species have been identified within the Seashore. These include 9 invertebrate, 3 fish, 1 reptile, 19 bird, and 8 mammal species (appendix E). In the federal system, species of concern are those for which USFWS is collecting additional information to determine whether they warrant consideration for future listing as threatened or endangered under the ESA. Due to lack of appropriate habitat, none of these species are likely to occur within the project area.

IMPACT TOPIC: COASTAL FLOOD ZONES

Executive Order 11988, “Floodplain Management,” provides for the protection of floodplain values, while the NPS *Procedural Manual 77-2: Floodplain Management* provides requirements for implementing the Executive Order (NPS 2003a). Floodplains, in the truest sense, are fluvial lands formed from freshwater streams and rivers that receive floodwaters once the water has overtopped the bank of the main channel. This is typically the result of a higher than normal influx of upstream water supplies (water moving from higher elevations to lower elevations). Floodplains are important resources in the storage and filtering of these floodwaters. Construction and development within a floodplain can result in long-term direct impacts such as decreased flood storage volumes, the restriction of natural flow patterns, and the exacerbation of catastrophic flooding in downstream areas.

The principal sources of catastrophic flooding affecting coastal areas, including Drakes Estero, are tidal storm surges and tsunamis. Tidal storm surges occur when water is pushed by high winds and exceptionally high tides from a low elevation to a higher elevation because of coastal storms and hurricanes. Tsunamis are large sea waves created by oceanic earthquakes, submarine landslides, or volcanic eruptions. NOAA identifies regions subject to potential tsunami inundation. Drakes Estero falls within this tsunami inundation zone (State of California Emergency Management Agency 2009).

Flood zones are geographic areas that are defined by the Federal Emergency Management Agency (FEMA) based on flood risks. Each zone reflects the severity or type of flooding in the area. FEMA identifies flood zones as Special Flood Hazard Areas, areas where floodplain management must be enforced (FEMA 2009). These areas can be subject to the risk of flooding by any natural means, whether by water cresting the banks of channels (fluvial floodplain) or by tidal surges and tsunamis. A flood insurance study that evaluated the flood risk of the numerous streams and bays in Marin County was prepared by FEMA in 2009, but did not include site specific information on Drakes Estero.

The California Department of Public Health (CDPH) oversees the harvesting times of shellfish relative to water quality. CDPH published a “Sanitary Survey Report – Shellfish Growing Area Classification for Drakes Estero, California” for this purpose (Baltan 2006). In that report, it was noted that “[d]uring extreme hydrographic conditions Estero water floods into the oyster company’s plant area. Extreme high tides (over 6 feet), rainfall and winds can all combine to bring water over the Estero banks and into the DBOC plant area. This occurs once or twice a year” (Kevin Lunny, pers. comm. as cited in Baltan 2006).

No gauge data or FEMA modeling results are available that specify the 100-year and 500-year flood elevations specifically for Drakes Estero. While there were various accounts of flooding at the site, no site specific elevation information was available. As a result, a site specific survey was conducted and the data were evaluated in the context of the FEMA study to draw reasonable conclusions about the potential for flooding at Drakes Estero. The closest coastal site evaluated by FEMA is Bolinas Bay/Stinson Beach, which is approximately 17 miles southeast of Drakes Estero. Bolinas Bay maintains unrestricted connectivity with the Pacific Ocean. The FEMA study concluded that a 100-year flood event (an event that has a 1 percent chance of occurring in any given year) would flood the immediate shoreline of Bolinas Bay to an elevation of 8.2 feet (North American Vertical Datum of 1988 [NAVD–88]). The 500-year flood event would flood the shoreline to an elevation of 8.5 feet (NAVD–88). While the FEMA analysis for Bolinas Bay provides a quantifiable flood level resulting from the potential 100-year and

500-year storm events, a direct correlation is not fully assumed between Bolinas Bay and Drakes Estero. Nevertheless, FEMA flood zone elevations for Bolinas Bay provide benchmark data helpful in understanding the potential for flooding in Drakes Estero.

A topographic survey was performed at the onshore facilities based on NAVD-88 (figure 3-6). The purpose of the survey was to verify the topographic elevations of the onshore features and correlate those elevations associated with historically measured flood events so as to predict the level of flooding during future storm events. Ground elevations and floor elevations of buildings, ground elevations of wrack lines, and the elevation of the high tide line on the day of the survey (May 5, 2011) were measured and mapped. A large majority of the onshore facilities occur on land with a topographic elevation between 7 and 9 feet. The stringing shed and processing plant were found to have finished floor elevations below 8 feet, while the NPS vault toilet, DBOC shop, and punching shed have finished floor elevations between 8 and 9 feet. All other structures have finished floor elevations above 10 feet.

The high tide water line on May 5, 2011, was measured at 3.9 feet NAVD-88 at 3:40 p.m. When correlating this measured tide elevation at the onshore facilities with the NOAA tidal gauge station near the Point Reyes Light Station (Gauge 9415020), the gauge reading was found to be exactly the same elevation for the same high tide event at 2:08 p.m. This suggests that the readings at Gauge 9415020 are reflective of the same tide elevations at the onshore facilities in Drakes Estero, with a tidal correction of approximately 92 minutes.

Since the Point Reyes Light Station tidal gauge appears to reflect the same tidal elevation as Drakes Estero, the gauge data was used as a reliable source to look at the historic record and extrapolate the flood results in Drakes Estero from a known storm. The most recent storm event, on March 20, 2011, was chosen for this evaluation because this storm may have inundated much of the onshore area, while at the same time leaving behind significant damage to onshore facilities as well as field evidence that could be surveyed. Damage included destruction of the wooden work platform, two docks, the washing station and conveyor, and the stringing shed. A gauge reading of 8.12 feet was measured during this storm at the Point Reyes Light Station tidal gauge, just shy of the 100-year flood elevation of 8.2 feet determined by FEMA for Bolinas Bay. This measurement was compared to the surveyed elevation of four debris wrack lines at the onshore facilities originating from the March 20, 2011, flood event. One wrack line was located east (landward) of three setting tanks, another debris wrack line was found immediately south of other setting tanks, and the two other wrack lines were surveyed at the toe of shell piles. Each wrack line was measured at topographic elevations ranging between 8.7 feet to 9.2 feet NAVD-88, higher than the 8.12-foot gauge elevation at the light station for the same storm event. The 0.6- to 1.0-foot positive differential implies that the wrack deposition elevations are a function of wave runup at the time of the 8.12-foot crest. Thus, the flood from the March 20, 2011, event is believed to have reached an elevation near 9.0 feet, taking into consideration the gauge reading of 8.12 and wave runup of an additional 0.88 feet.

If the FEMA 100-year flood elevation for Bolinas Bay of 8.20 feet is applied to Drakes Estero, adding 0.88 feet for wave runup would result in a flood elevation of 9.08 feet. Thus, an elevation of 9.0 feet appears to be a reasonable estimate of the 100-year flood elevation for purposes of this EIS. Figure 3-6 depicts the approximate area of inundation at the onshore facilities based on the 9-foot contour line covering approximately 2.44 acres of the project area (approximately 0.86 acres within NPS facilities and 1.58 acres of DBOC facilities). At this elevation, the kayak launch parking lot, NPS vault toilet,

DBOC driveway, DBOC stringing shed, conveyor foundation, processing plant, shop, and punching shed would have been inundated by a few inches. In addition, several above ground caps to the DBOC wastewater storage tank fall below this flood elevation. Available ground photographs after the storm event show that shifting of the setting tanks caused by wave action had occurred. Additionally, water would have inundated land underneath the temporary office trailer and the two mobile homes abutting the pond, although water did not reach their floor elevations (11 feet). Situated above the 9-foot contour, the office warehouse, cannery storage trailers, main house, mobile home adjacent to the main house, and cabin remained dry during the March 20, 2011, event.

Currently, offshore structures incur daily flooding as part of their normal function, and a 100-year flood event would be no different in that regard. However, severe flood events are typically associated with high winds and waves that have historically caused portions of offshore structures to dislodge and wash ashore. It is the responsibility of DBOC to monitor the offshore structures and clean up dislodged materials found floating or along the shoreline.

Important to future floodplain and resource management, currently documented rates of sea-level rise due to climatic warming trends, water expansion, and vertical land motions (tectonics) predict increases in mean sea level as high as 5.48 feet by the year 2100 (Cayan et al. 2009; Heberger et al. 2009, NAS 2012b). This equates to water levels rising as much as 0.66 inch on average per year. Over the next 10-year period under consideration in this EIS, this could mean a potential rise in sea level of 6.6 inches. A rise of this magnitude could cause a change in the 100-year flood elevation from FEMA-reported 8.2 feet to 8.75 feet NAVD-88. Taking into consideration an estimated wave runup of approximately 0.88 feet, the inundation elevation could reach 9.63 feet (approximately 9.6 feet) due to sea level rise in 10 years. This elevation is displayed in figure 3-6 as the 9.6 contour line.



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**FIGURE 3-6
Potential Flood Zone**



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IMPACT TOPIC: WATER QUALITY

Drakes Estero is a shallow-water lagoon with small levels of contributing freshwater sources within its watershed. A single, open-water passage to Drakes Bay occurs at the mouth of Drakes Estero that allows two tidal exchanges each day with Drakes Bay. This exchange effectively cycles oceanic water at a volume equal to that contained in Drakes Estero on a daily basis (NAS 2009). The average current velocity just inside the lagoon within the main channel was found to be 40.6 cm/sec (1.33 feet/sec) (Anima 1990^{xxviii}). Salinity levels range between 33 and 37 parts per thousand (Anima 1991^{xxix}), and water temperatures were near that of the oceanic source. More detailed information on the biogeochemical processes affecting the general condition of the water in the estero is provided in previous sections in this chapter. Overall, the daily tidal exchange in a shallow lagoon coupled with the relatively low level of anthropogenic watershed disturbances and inputs are contributing factors to the good water quality of Drakes Estero (Baltan 2006, Zubkousky 2010, NAS 2009).

Nutrient levels within estuary systems can vary greatly depending on factors such as residence periods, watershed conditions, tidal exchange rates, and biological processes. Biological processes most relevant to Drakes Estero are those provided by the bivalves as part of the DBOC mariculture operation. As noted earlier, bivalves can play an important role in water quality as suspension feeders (Dame 1996, Newell 2004). Shellfish are capable of capturing and process suspended inorganic silt, organic particulates, and phytoplankton from the water column, thus reducing water turbidity and allowing more sunlight to reach the bottom substrate. Bivalves, through ingestion and processing of suspended particles, also remove nitrogen and phosphorus from the water column, and either sequester these nutrients as tissue and shell or transfer these materials as feces and pseudofeces deposited to the sediment surface. Some of the nitrogen absorbed by bivalves is excreted as urine back into the water column elevating the level of dissolved nitrogen as ammonia for use by new phytoplankton and microbenthic organisms (Newell 2004).

While water quality studies measuring nutrient levels have been performed on area freshwater streams at Point Reyes (Hagar 1990 as reported by Anima 1990^{xxx}; NPS 2001c), few data are available on nutrient levels in Drakes Estero. Wechsler (2004^{xxxi}) quantified water quality parameters during his study on ichthyofauna in an effort to determine if biodeposits from the cultivated shellfish negatively affected water quality. This 2003 data, during a year when oyster production from the Johnson Oyster Company was approximately 40 percent of the 2010 DBOC production level, sheds some light on the overall condition of the estero, but also provides some insight into the influence of filtering bivalves on water quality in Drakes Estero. Water samples were analyzed at three locations for comparison – 1) Schooner Bay adjacent to oyster racks, 2) Schooner Bay away from oyster racks, and 3) the neighboring Estero de Limantour where no shellfish racks occur. Parameters measured included salinity, temperature, clarity, dissolved oxygen, ammonia, nitrate, and total suspended solids. Samples were taken 30 cm below the surface and analyzed at the DANR Analytical Lab at the University of California, Davis. Clarity was measured using a Secchi disk. Water quality data from Wechsler indicate essentially no difference in the water quality parameters between areas in Schooner Bay and Estero de Limantour (appendix H). He concludes, “In Drakes Estero, the tidal prism is high and a large volume of water drains twice daily. The anecdotal look at aquatic physico-chemical conditions undertaken in this study indicated that no major deteriorations in water quality existed adjacent to oyster racks.” Again, Wechsler’s purpose of collecting this data was to determine the potential harm biodeposits may have on water quality (Wechsler 2004). The data, however, also suggests that the influencing affect of filter feeding bivalves on the quality of the water column of Drakes Estero is

indistinguishable in this lagoonal setting, and the water quality results are more so a function of, as Wechsler (2004) describes, a “well mixed water body with no stratification.”

The Seashore initiated a study of the water quality of Drakes Estero that served to investigate possible pollution from pesticides/herbicides and sediment inputs. Sediment rates were found to fluctuate between 12 and 30 centimeters per 100 years over the last 120 to 150 years (Anima 1990^{xxxii}). This study also concluded that sedimentation rates have increased in the last 150 years, possibly attributable to an increase in land uses such as trails and roads (Anima 1990^{xxxiii}). The increase in sediments due to cattle operations, however, is “very difficult to substantiate based on the change in population and overall land use of the area over the last 150 years.” Anima (1990) found that the sedimentation rates of Drakes Estero closely resemble sedimentation rates calculated by other researchers working in similar environments. In summary, he concludes:

Drakes Estero is a slowly filling system that is being supplied with sediment from the open marine environment, streams, aeolian deposition, biological reworking, and erosion of the surrounding bedrock. Tidal action is playing the dominant role in sediment distribution, erosion of surrounding bedrock and overall flushing of the system.

Anima also collected sediment samples across Drakes Estero to perform laboratory analyses of pesticide/herbicide concentrations. The conclusion reached was that the levels observed were “near or below the detection limits of the analytical methods used.” In his 1991 paper, Anima went further to state that the levels of pesticides/herbicides in the sediment of Drakes Estero were found to be “below the level of limits for ingestion by organisms as set by the National Academy of Sciences and the Environmental Protection Agency.”

CDPH maintains regulations on water quality affecting the safe use of public waters. Water quality standards differ depending on the particular use. For instance, California’s minimum bacteriological standards for recreational use based on a single sample are a count of either 10,000 total coliform bacteria per 100 milliliters (/100 ml), 400 fecal coliform bacteria/100 ml, or 104 enterococcus bacteria/100 ml. Fecal coliform standards for shellfish harvesting in Drakes Estero are much more stringent, at a geometric mean of 14 most probable number (MPN)/100 ml or a ninetieth percentile value of 43 MPN/100 ml when combined with a declining trend in fecal coliform levels at the sampling station or in surrounding areas (CDPH 2012).

CDPH Division of Drinking Water and Environmental Management Preharvest Sanitation Unit is tasked with conducting sanitary surveys of shellfish harvesting areas as part of the National Shellfish Sanitation Program. For every commercial shellfishing operation in the state, CDPH prepares a site-specific management plan in which shellfish harvesting areas are classified as *approved*, *conditionally approved*, or *prohibited* based on the water quality sampling and mollusc sampling results. The program is designed to restrict mariculture harvesting during periods when fecal coliform or marine biotoxin levels may temporarily exceed existing standards.

CDPH routinely prepares a *Management Plan for Commercial Shellfishing in Drakes Estero, California*. The purpose of the management plan is to identify *Approved*, *Conditionally Approved*, and *Prohibited* areas. Harvesting shellfish in *Prohibited* areas is not allowed. For *Conditionally Approved* areas, the plan defines “the criteria and procedures used by the state shellfish authority for determining when bivalve shellfish can

be harvested for marketing from a shellfish growing area” (CDPH 2012) based on site specific sampling of water and shellfish tissue. *Approved* areas have no time restrictions on harvesting shellfish.

In 2006, the CHPH reported Drakes Estero as “one of the most pristine estuaries on the west coast,” and concludes that the entire body of Drakes Estero has very good water quality (Baltan 2006). However, because Drakes Estero does experience intermittent bacterial pollution, most of the shellfish harvesting areas are classified as *Conditionally Approved* with time restrictions before harvesting can resume. One area at the culture bed #17 near the mouth of Drakes Estero was classified as *Approved*, and the upper reaches of Creamery Bay, Barries Bay, and Home Bay upstream from culture beds were classified as *Prohibited* (Figure 3-7). Annual updates to the report have been conducted (Zubkousky 2010, 2011; CDPH 2012). Each update to the plan evaluated all environmental factors to identify actual and potential pollution sources affecting water quality within Drakes Estero. Both Baltan (2006) and Zubkousky (2011) list five potential source types of bacterial pollution potentially affecting the water quality of Drakes Estero. These sources include cattle operations, septic systems, industrial waste, wildlife, and watercraft. The CDPH 2012 plan cites pollution sources as “cattle pastureland, deer and other terrestrial wildlife, birds, harbor seals, sea lions, and, to a minor degree, human activity.” The primary source of bacterial pollution is from cattle waste originating from the six cattle ranches within the watershed. Only beef cattle are raised within the Drakes Estero watershed, and ranchers in cooperation with the NPS have installed riparian fencing and implemented other BMPs to reduce cattle access to stream habitat. In 1991, Anima cites these ranches as having a total of 1,185 head of cattle (Anima 1991^{xxxiv}), whereas Press (2005) refers to 700 head of cattle. This change in cattle can be attributed to overall reduction in permitted Animal Unit Months during that period. Bacterial pollution derived from wildlife and boaters was too difficult to measure, but was presumed to be limited (Zubkousky 2010).

Fecal coliform levels in most of Drakes Estero have been shown to intermittently rise after rain events associated with runoff from pastures within the watershed (Baltan 2006; Zubkousky 2011). On past occasions, range septic systems have failed and were immediately repaired by the Seashore (Baltan 2006). Leased cattle ranches surrounding Drakes Estero allow cattle to graze within close proximity to the shoreline. Other than the upper reaches of Barries, Creamery, and Home Bays, the 2012 management plan states, “because of the residential units, company buildings, and the on-site septic system, a small *prohibited* area has been established at the upper end of Schooner Bay. This area extends approximately 50 feet outward in all directions from the shellfish plant.” Figure 3-7 depicts CDPH sampling sites in Drakes Estero, as well as the prohibited and conditionally approved areas. In 2007, CDPH added another monitoring station in Schooner Bay near culture Bed 5 due to reported cattle being close to the shoreline.

The 2012 management plan classifies most of the other licensed areas as *conditionally approved*, and establishes standards and procedures for closing harvesting when fecal coliform levels are predictably elevated after rainfall events. Shellfish harvesting closures of 7 days are required at Inner Schooner Bay when a single rainfall event exceeds 0.7 inch during any 24-hour period. The remaining *conditionally approved* areas require a minimum closure period of 3 days following a rainfall event exceeding 0.75 inch during any 24-hour period. For all areas, immediate closure of shellfish harvesting is required when rainfall in excess of 2.5 inches occurs over a 7-day period.

The CDPH Sanitary Survey Report of 2010 (Zubkousky 2010) reports that rainfall-driven harvesting closures during the 2009–2010 monitoring year amounted to 54 days for Inner Schooner Bay, 77 days for all other *conditionally approved* areas, and 14 days for the *approved* areas. Zubkousky (2010) reports also

that DBOC complied with all required closures during the 2009–2010 monitoring year. The following 2010–2011 monitoring season, Zubkousky (2011) cites rainfall-driven harvesting closures at Schooner Bay were 113 days, all *conditionally Approved* areas except Schooner Bay were closed for 71 days, and the *Approved* area was closed for 32 days. DBOC complied with all closures during this monitoring period and fully cooperated with providing samples (Zubkousky 2011).

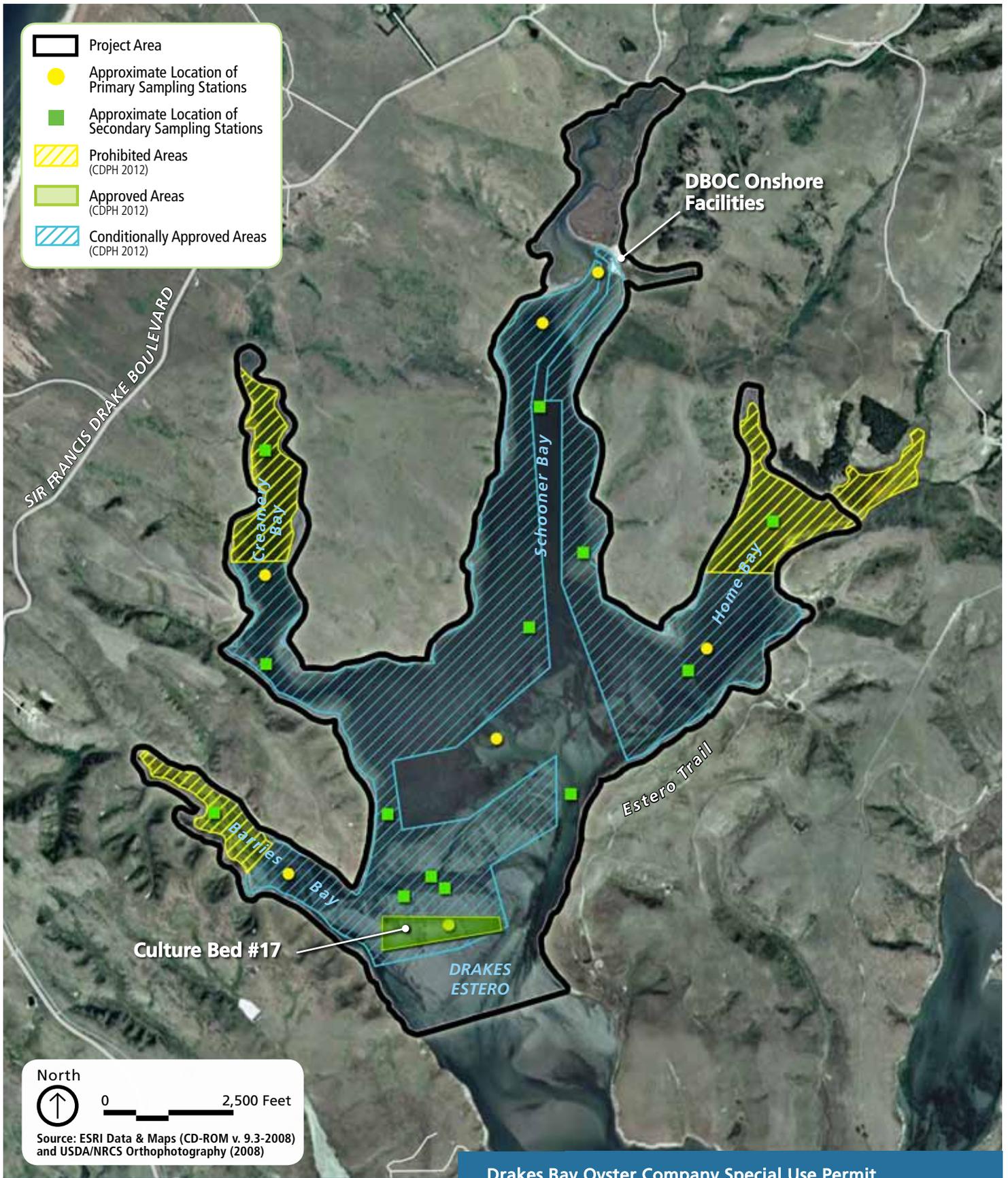
The management plan calls for self-monitoring of water quality to protect against contamination events not linked to rainfall, such as emergency sewage spills. Any water quality sample having a fecal coliform measurement greater than 43 MPN/100 ml will cause the area represented by that sample to be immediately closed for harvesting. For the growing area to be reopened to harvesting, the sampling result for fecal coliform must be equal to or lower than 14 MPN/100 ml (CDPH 2012). Actual water quality samples in Drakes Estero detected low levels of fecal coliform during the 2009 through 2011 monitoring periods (Zubkousky 2010, 2011). Fecal coliform geometric means and estimated ninetieth percentiles from the water quality samples were far below the thresholds for shellfish growing waters.

In the 2006 sanitary survey report, Baltan stated that the only source of commercial wastewater entering Drakes Estero comes from the shellfish washing operations. This water is simply recycled water originating from Drakes Estero to clean harvested oysters at an outdoor spraying station. The water from the spraying station is allowed to return to Drakes Estero via surface sheet flow. The washing station removes attached sediments and fouling organisms from the oysters before the oysters are sent to the processing plant. No chemicals are added to the water for the washing operations. Water from the washing operations was found to be nonhazardous (Baltan 2006).

The 2006 sanitary survey report also cited the septic system at the DBOC plant as being in poor condition prior to the mid 1990s. In 1998, a newer and larger septic system with a 27-bedroom capacity replaced the older system. Currently, there are five homes containing a total of 14 bedrooms at DBOC; thus, the septic system has sufficient capacity to treat the wastewater produced by DBOC residents. Another septic system was installed at DBOC in 2005 to treat commercial wastewater originating from the shucking building, the plant, and a retail area (Baltan 2006). Both systems use 1,500-gallon underground storage tanks located near the facilities that temporarily store wastewater until it is pumped to two leach fields located upslope approximately 450 and 1,300 feet east/southeast from the main facilities. Marin County

Environmental Health Services regulates septic systems in the county. DBOC has entered into an agreement with Marin County Environmental Health Services that includes quarterly monitoring and an annual inspection by a Marin County Environmental Health Services–registered engineer and sanitarian. No septic failures are known to have occurred, although Zubkousky (2010) recognizes the “potential” pollution from area septic systems, but with no quantifiable data.

The CDPH (2012) management plan for Drakes Estero requires collective shellfish sampling for marine biotoxins. These are measured via shellfish tissue samples. The two primary biotoxins include PSP and domoic acid. PSP is an acute form of food poisoning derived from shellfish that have fed on the toxin-producing dinoflagellate *Alexandrium catenella*. Toxic concentrations between 200 and 500 micrograms per 100 grams of shellfish tissue when ingested by humans will cause minor symptoms of sickness. Levels between 500 and 2,000 micrograms will cause moderate symptoms, and ingestion of over 2,000 micrograms can be lethal (Langlois 2009). The federal alert level for PSP is 80 micrograms per 100 grams. Domoic acid is a biotoxin that originates from the diatom *Pseudo-nitzschia australis* (Langlois 2009).



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**FIGURE 3-7
Water Quality**

Ingestion rates between 27 and 75 micrograms per gram of tissue may lead to mild to moderate symptoms of sickness, while concentrations greater than 450 micrograms per gram may result in severe neurological symptoms and/or death. The alert level for domoic acid is 20 micrograms per gram.

CDPH performs a monthly analysis of shellfish samples submitted by statewide mariculturists, state agencies, and local health departments (Langlois 2009). Results are reported monthly and summarized in an annual report covering the entire state of California. The two latest annual reports for 2009 (Langlois 2009) and 2010 (Langlois 2010) are summarized in this section. DBOC contributes more samples to CDPH than any other collector, with samples collected from 4 stations on a weekly basis. PSP is triggered by the dinoflagellate *Alexandrium catenella* that is normally first observed along the open coast before transport into bays and estuaries (Langlois 2009). *The Marine Biotoxin Monitoring Program Annual Report 2009* (Langlois 2009) states that PSP levels reached their highest in August of the 2009 monitoring year, with a reading of 966 micrograms per 100 grams taken from a sample of sentinel sea mussels from Drakes Estero. PSP levels in 2010 were much less, with only one sample reaching 147 micrograms per 100 grams. Domoic acid, from the diatom *Pseudo-nitzschia australis*, will commonly oscillate in toxicity across the entire California coast. While two peaks occurred in 2009—one in the spring and another during the fall—Drakes Estero samples were not reported to be included in the peak readings (Langlois 2009). Fifty-eight (58) statewide samples were detected having measurable amounts of domoic acid in 2009. The number of samples with domoic acid increased in 2010 (149 samples) (Langlois 2010). Concentrations of domoic acid above the alert level (20 µg per gram of shellfish, or 20 parts per million [ppm]) were detected in 50 samples from the following eight counties: Marin, San Francisco, San Mateo, Monterey, Santa Barbara, Ventura, Los Angeles, and San Diego.

GROUNDWATER

The Marin County Community Development Agency oversees and regulates the drinking water supplies in the county to ensure “the water shall meet the physical, chemical, and bacteriological standards of the California State Department of Public Health and the U.S. Environmental Protection Agency.” Potable water within the Drakes Estero watershed is provided via groundwater wells at the farm residences and within the pasturelands to supply water to cattle watering tanks. Additionally, a drinking well at the DBOC plant supplies potable water for the workers and residents. Water samples from this well are submitted weekly by DBOC to CDPH Drinking Water Unit (DBOC 2010v^{xxxv}) to be tested for contaminants. In a letter dated August 3, 2009, from the Seashore to DBOC, the Seashore recognized a

drilled well located on the slope above the residences, a hydropneumatic tank, iron removal, and distribution piping. The well is reported to have a sanitary seal, and there are no apparent sources of contamination within a 50-foot radius. Chlorination of the water is not done. Periodic bacteriological testing is reportedly done weekly, with no positive results reported. (NPS 2009b)

A report was produced by CDPH in 2002 that assessed the vulnerability that source well water at the onshore facilities could be contaminated by any possible contaminating activities (PCA) (CDPH 2002). The only PCA in the area cited in the report was the septic drain field. The report did not indicate any contaminants in the DBOC well water.

IMPACT TOPIC: SOUNDSCAPES

The Seashore's natural soundscape encompasses all the natural sounds that occur in the Seashore and the natural conditions for perceiving those sounds. This includes sounds that are part of the biological or other physical resource components of the Seashore, such as birds singing, waves crashing, or wind blowing through trees. Section 4.9 of *NPS Management Policies 2006* directs NPS to preserve, to the greatest extent possible, the natural soundscapes of units of the national park system. Additionally, NPS will restore to the natural condition wherever possible those soundscapes that have become degraded by noise. *Director's Order 47: Soundscape Preservation and Noise Management (DO-47)* further guides toward the maintenance and restoration of natural soundscapes. DO-47 states that "nearly as many visitors come to national parks to enjoy the natural soundscape (91 percent) as come to view the scenery (93 percent)" (NPS 2000).

Sound consists of pressure variations that move through a medium such as water or air, which are measured in terms of amplitude and frequency. The magnitude of noise is usually described by its sound pressure level. The range of sound pressure varies greatly, so a logarithmic scale in decibels (dBA) is used to relate sound pressures to a reference standard (i.e., 20 microPascals in air, 1 microPascal in water). Sound pressure levels are often defined in terms of frequency-weighted scales (A, B, C, or D). The A-weighted decibel scale is used most commonly; it reflects the varying frequency sensitivity of the human ear to low level sounds (low level meaning 40 dBA above the human threshold of hearing at 1 kilohertz [kHz]). All of the sound level measurements in this document represent 1 second A-weighted average level measurements, or $L_{Aeq,1s}$ in the standard terminology of the American National Standards Institute (ANSI 1994). However, for simplicity and conformance with many other public documents, all sound level values will be denoted by "dBA," a common term for the same measurement. Table 3-2 provides a reference list of sound levels for comparison.

Noise is defined as extraneous or undesired sound (Morfeý 2000). Noise is sound produced for no purpose, or sound that a listener finds objectionable. Sources of noise within or nearby national parks include: vehicles (cars, buses, or other vehicles) used for tours and access to trails and campgrounds; aircraft overflights from planes, helicopters, and military jets along with airport development; snowmobiles and watercraft; park operations and infrastructure; and energy development (NPS 2009f).

SOUND LEVELS AT DRAKES ESTERO

In preparation for an Air Tour Management Plan, acoustic data were collected at the Seashore in 2009-2010 by the John A. Volpe National Transportation Systems Center (Volpe) to establish ambient sound levels in four areas of distinct vegetation, topography, elevation, and climate (Volpe 2011). Drakes Estero was selected as a measurement site to represent wetlands, which comprise 33 percent of Point Reyes National Seashore. Measurements were taken at a bluff on the eastern shore of Drakes Estero over the course of 30 days in July/August of 2009 and 29 days in January/February of 2010. This site was located approximately 60 yards from the shore of Drakes Estero and 2 miles from the DBOC buildings. Data were collected at three other sites in Point Reyes, miles away from Drakes Estero in different ecological settings.

The variety of summary sound level data in the Volpe report presents many possible choices for the reference ambient sound level, which will be used in the noise impact analysis in chapter 4. Sound levels vary from moment to moment, and in addition to short-term variations most sites exhibit trends associated with time of day and time of year. Sound levels are usually higher during the day than at night, for example, and park visitation tends to be highest in the summer season.

In order to express the range of variation in sound levels, Volpe (2011) included three measurements: L_{Aeq} , L_{50} , and L_{90} . L_{Aeq} is an average value called an equivalent continuous sound level. For example, at the Drakes Estero site the daytime (7 am to 7 pm) L_{Aeq} was 41.6 dBA in winter and 40.3 dBA in summer. This means that the sum of all of the sound energy measured during these 12 hours was equivalent to a constant sound level of 41.6 dBA in winter and 40.3 dBA in summer (Volpe 2011). L_{Aeq} is strongly influenced by the loudest intervals, so it is generally more useful for describing noise sources than background environmental levels.

A more intuitive measure of environmental conditions is the L_{50} , which is the level that is exceeded 50 percent of the time: the median level. The daytime L_{50} at the Drakes Estero site was 35.8 dBA in winter and 33.8 dBA in summer (Volpe 2011). The L_{50} is the most intuitive and readily interpreted of the available measurements; a visitor has a 50-50 chance of experiencing levels this high or higher. L_{50} does not represent the quiet background conditions that might be experienced, because it includes noise from all human activities as well as natural sound energy from portions of the audio spectrum much higher in pitch than the noise generated by DBOC.

Both the L_{Aeq} and L_{50} values were influenced by existing noise at the site, including noise from DBOC operations. Accordingly, a third value is presented, the L_{90} , or the sound level that is exceeded 90 percent of the time. This approximates the background or residual sound level that would exist in the absence of all nearby or otherwise distinguishable sounds (ANSI 1988). For both the winter and summer Drakes Estero data, the daytime L_{90} was 25.7 dBA (Volpe 2011).

L_{Aeq} is not a preferred measurement for representing ambient sound levels, because loud events bias this value well above the L_{50} . The L_{90} value is supported by a national standard (ANSI 12.9-1) as an approximation of the background level against which all sounds are heard, and the summertime L_{90} summary provided by Volpe was fairly close to the lowest daily L_{50} measured at Drakes Estero (25.7 versus 25 dBA) (Volpe 2011). Accordingly, the L_{50} and L_{90} values document the range of sound levels that can be interpreted as the background against which DBOC sounds occur for the impact analysis in Chapter 4.

The daytime summer L_{50} is rounded to 34 dBA and used to generally describe the reference ambient level within the project area. This reference ambient level of 34 dBA represents a reasonable summary of all of the data in the Volpe report. The daily L_{50} values at Drakes Estero ranged from 44 to 25 dBA. The winter L_{50} summary value was only slightly higher at 35.8 dBA, which was likely due to higher wind speeds. However, the L_{90} summaries for summer and winter data were identical (25.7 dBA), indicating that background sound levels in between distinguishable sound events was the same in both seasons. Although the other three sites monitored by Volpe were quite distant from Drakes Estero, and in very different environments, the summer daytime L_{50} values ranged from 31.8 to 36.7 dBA, narrowly bracketing the reference ambient value of 34 dBA.

Decibels are unfamiliar units to many people, and the measurements made at Drakes Estero may not be easy to interpret in isolation. Table 3-2 provides examples of sound levels associated with possibly familiar outdoor and indoor situations. In this context, median (L_{50}) and background sound levels (L_{90}) at Drakes Estero are as low as or lower than the quietest moments that most people experience in everyday life.

TABLE 3-2. INDOOR AND OUTDOOR SOUND LEVELS

Outdoor Sound Levels	Sound Level (dBA)	Indoor Sound Levels
	110	Rock band at 5 meters
Jet overflight at 300 meters	105	
	100	Inside New York subway train
Gas lawnmower at 1 meter	95	
	90	Food blender at 1 meter
Diesel truck at 15 meters	85	
Noisy urban area—daytime	80	Garbage disposal at 1 meter
	75	Shouting at 1 meter
Gas lawnmower at 30 meters	70	Vacuum cleaner at 3 meters
Suburban commercial area	65	Normal speech at 1 meter
	60	
Quiet urban area—daytime	55	Quiet conversation at 1 meter
	50	Dishwasher next room
Quiet urban area—nighttime	45	
	40	Empty theater or library
Quiet suburb—nighttime	35	
	30	Quiet bedroom at night
Quiet rural area—nighttime	25	Empty concert hall
Rustling leaves	20	
	15	Broadcast and recording studios
	10	
	5	
Reference pressure level	0	Threshold of hearing at 1 kHz

Source: Federal Highway Administration (FHWA) 1980.

The other noteworthy fact about decibels is that seemingly small values can represent a significant difference. For example, the difference between the L_{Aeq} to the L_{50} values (41.6 and 35.8 dBA) translates to a scenario that would nearly double the distance at which a nearby sound could be heard. The difference between the L_{50} to the L_{90} values above (35.8 and 25.7 dBA) translates to a scenario that would cause a more than three-fold increase in the distance at which a nearby sound could be heard.

DBOC NOISE SOURCES

Overview

NPS did not obtain noise measurements of operational DBOC equipment in Drakes Estero. Data were provided by Environ International during the public comment period for the Draft EIS (Environ 2011), but these measurements are problematic to interpret and use. Environ did not follow pertinent standards and the measurement processes and the operating conditions of the equipment were not adequately described.¹ To address these concerns, the Environ measurements were compared with reports that document noise levels measured under specified conditions from comparable equipment. For outboard motor noise, precise measurements of noise were available for motors with the same horsepower rating. For other equipment categories, measurements expressing a range of noise levels were available. Front end loaders, for example, span a wide range of configurations in size and power. DBOC is likely to be using the smallest units in these equipment classes, so the lowest noise level in the reported range of values was used. Other sources of noise related to DBOC operations include radios, air compressors, and vehicles. These items are not included in this description, because no data are available regarding their noise levels or their frequency of use. For example, Environ presents the noise level of the compressor used to power the pneumatic tools at 58 dBA and described the compressor operations as intermittent, but did not provide an estimate of the duration of compressor operations. The air compressor is housed in a building (with openings), and the measurement was taken from outside the enclosure (Environ 2011). Collectively, the description of the noise emitted by the equipment summarized in table 3-3 and discussed in additional detail below is unlikely to overestimate noise generated by DBOC operations.

Noise source data are referenced to a standard measurement distance. All noise source levels presented here are referenced to a nominal distance of 50 feet, which is the reference distance for NPS noise regulation (36 CFR 2.12) and U. S. Federal Highways construction equipment measurements (FHWA 2006). The limit specified by NPS regulation is 60 dBA at 50 feet (36 CFR 2.12). A 74 dBA source (at 50 feet) has the same effect as more than 23 sources at 60 dBA running simultaneously. Additional perspective on how this sound is perceived and how it alters the soundscape of an area is discussed below.

It should be noted that noise level varies with the conditions under which the equipment is used. For example, an outboard motor produces much less noise at idle than at full throttle. The noise measurements reported in the literature correspond to the highest noise level that is generated in routine use. For example, the U. S. Federal Highways Construction Noise Handbook (FHWA 2006) reports the L_{max} during operations for all of its measurements. For boats, the standard measurement captures the peak noise level that occurs as the boat drives past the measurement device in a straight line. The peak noise level for boats corresponds to the point on the straight line track that is closest to the measurement device. More information on how noise spreads is provided below.

The reference levels for DBOC noise sources are summarized in table 3-3. The descriptions and frequencies of use are based on information provided by DBOC (DBOC [Lunny], pers. comm., 2011h). The range of

¹ NPS requested clarifying information regarding the Environ measurements from DBOC in a letter dated April 6, 2012. Clarifying information was provided to NPS in DBOC's June 5, 2012 letter. This information was reviewed; however, it did not adequately describe measurement processes and descriptions of operating conditions.

plausible noise levels for DBOC equipment derived from data reported by Environ (2011) were compared with the noise levels reported in other sources for comparable equipment. A full discussion of the rationale for selection of lower and upper bounds of operational noise levels follows table 3-3.

TABLE 3-3. NOISE GENERATORS AT DBOC

Equipment*	Description*	Duration of Use (Weather Permitting)*	Range of Operational Noise Levels (dBA at 50 ft)	
			Lower Bound	Upper Bound†
Pneumatic drill	Small hand tool	2 to 4 hours/day	67 [‡]	80 [§]
Motorboat	20 or 40 hp, 4-cycle engine	Approximately 12 40-minute trips/day	62	74 [#]
Front end loader	60 hp diesel engine	2 to 4 hours/day	67 ^{**}	73 ^{††}
Oyster tumbler	Tube for sorting oysters by size, run by electric motor	Approximately 2 hours/day	50 ^{‡‡}	75 ^{§§}

Sources: * DBOC [Lunny], pers. comm., 2011h

† These operational noises levels are the upper bound of the range used for the impact analysis later in this document; however, as discussed in the text below, these noise levels do not represent the maximum noise levels produced by this equipment. Rather, these noise levels are intended to be realistic operational noise levels based on the literature cited.

‡ Environ 2011; Brueck, Stancescu, and Waters 2007, table 22, "power hand tools"

§ Environ 2011; Brueck, Stancescu, and Waters 2007, table 22, "power hand tools"; Army 2004², Appendix H2, "pneumatic wrench"

|| Environ 2011

Horn et al. 2005, Table 5.2.1-1; Rijikeboer et al. 2004, Figure 5.5; Menge et al. 2002, Table 6

** Environ 2011

†† FHWA 2006, Table 1, "Front End Loader"; Toth 1979, Table 3; Bender 1971, Table IV; Army 2004, Appendix H2, "wheeled loader"

‡‡ Environ 2011

§§ Army 2004, Appendix H2, "portable cement/mortar mixer"

² Information provided in the Army's 2004 summary of noise generation for construction equipment comes from various sources, as noted below. Whenever Army 2004 is referenced, the following sources are summarized in that reference:

EPA

1971 Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances. (NTID300.1). Prepared by Bolt, Beranek and Newman. U.S. Government Printing Office. Washington, DC.

Gharabegian, A., K. M. Cosgrove, J. R. Pehrson, and T. D. Trinh

1985 *Forest Fire Fighters Noise Exposure*. Noise Control Engineering Journal 25(3): 96-111.

Dennison, E. E., D. C. Kanistanaux, and S. Ying

1980 *Outdoor Noise of Coal-Fired Power Plants*. Noise Control Engineering 14(1): 30-37.

Cowan, James P

1994 *Handbook of Environmental Acoustics*. Van Nostrand Reinhold. New York, NY.

National Institute for Occupational Safety and Health

nd *NIOSH Sound Meter: How Loud is Your Workplace?* Operator position data from NIOSH website (www.cdc.gov/niosh/noise/hptherm.html) extrapolated to 50-foot distance.

nd *Carpenters Noise Exposures*. Operator position data from NIOSH website (www.cdc.gov/niosh/noise/chnoises.html) extrapolated to 50-foot distance.

Pneumatic Drills

DBOC utilizes two small, handheld pneumatic drills at the pneumatic drill use station located on the DBOC floating dock (Environ 2011 appendix B photo 1) to separate clusters of shellfish. The Environ report measured operation of only one drill due to space constraints, reporting peak noise levels of 77.5 dBA and 79.7 dBA were reported from this device, with an average level (L_{eq}) of 67.4 dBA over about one minute of unspecified use. Environ 2011 notes that assuming the two drills were working at the same location simultaneously results in a L_{eq} 3 dBA higher or 70.4 dBA. Brueck, Stancescu, and Waters (2007) made 83 measurements of power hand tool use in an industrial setting, yielding an average value (L_{eq}) of 91.9 dBA at 3 feet. Extrapolating this value to 50 feet yields a value of 67.5 dBA, which agrees with the Environ L_{eq} measurement. Other sources offer levels of 85 dBA (FWHA 2006), 84-88 dBA (Bender 1971), and 80-95 dBA (Army 2004). Some of these noise levels may reflect larger or noisier tools, but the lowest value in other references agrees with the peak level reported by Environ. Accordingly, values of 67 and 80 dBA will be carried forward in the Chapter 4 analysis to represent the range of noise levels generated by the pneumatic hand tools.

Motorboats

DBOC operates outboard motorboats with 20 and 40 horsepower engines, which equals approximately 15 and 30 kilowatt (kW) rated power. The value used in the Chapter 4 analysis was derived from four references. Horn et al. (2005) present regression lines that predict noise levels (25 meter distance, which converts to a distance of approximately 82 feet) at full throttle as a function of rated power (in kW); they predict levels of 69 dBA and 72 dBA for 20 and 40 hp. To translate these levels to a 50 foot measurement distance (15 meters), these values must be increased by $20 \cdot \log_{10}(25/15)$, or 4.4 dBA, yielding values of 73 and 76 dBA. Rijikeboer et al. (2004) presented measurements of outboard engines measured under lowest noise conditions (i.e., engines in optimal tune and on absolutely flat water conditions) at specified boat speeds. No motor was tested that was exactly equivalent to 20 hp, but motors that were 15 and 24.7 hp were tested at speeds of 19.3 and 24.9 mph. The measured levels, adjusted to a 50 foot distance, were 70.6 and 74.2 dBA. Five motors were tested that were rated between 38.9 and 39.4 hp equivalents, at speeds between 25 and 30 mph. The measured levels, adjusted to a 50 foot distance, were 72.3 to 75.4 dBA. Menge et al. (2002) measured six outboard motorboats of unspecified horsepower ratings at speeds from 9 to 39 mph in an arm of Lake Powell in Glen Canyon National Recreation Area. The maximum noise levels at 50 feet ranged from 67.8 to 80.8 dBA, with four of the measurements falling between 75.5 and 76.7 dBA.

The Environ report provided measurements of two motorboats carrying unspecified loads at an unspecified speed. The measurements were 63.4 dBA and 61.7 dBA. Photo 5 in Appendix B of the Environ report and the limited range of dBA values in the time series of boat noise measurements on page 6 of Environ's Appendix B suggest that the boat was moving at low speed (4 mph or less). Boat-to-microphone distance measurements submitted to DOI (Goodman 2012^{xxxvi}) enabled measurement of DBOC motorboat noise source levels using Volpe (2011) data collected at the PORE004 site. Six boat-to-microphone distances were matched to noise events, yielding measures of boat noise from 71.7 dBA to 85.1 dBA (appendix I). These data suggest that DBOC boats in Drakes Estero often operate at much higher throttle settings that were used in the Environ measurements. In order to more fully capture this range in operational boat noise levels, a value of 62 dBA will be retained from the Environ data to

represent low throttle settings, and 74 dBA as a representative value for higher throttle settings taken from the aggregate of three published reports and the Volpe PORE004 data from Drakes Estero.

Front-end Loader

DBOC operates a small front-end loader to move shells and other items at the processing station. The Environ report provided peak passby levels of 67 to 68 dBA when this vehicle drove past a sound level meter on a hemicyrcular course. The speed and bucket load were unspecified in the Environ report (and later communications). Three other references offer typical front-end loader noise levels of 79 dBA at 50 feet (Bender 1971; FHWA 2006) and 86.5 dBA (Toth 1979), though these measurements may represent larger machines than the unit used by DBOC. Bender (1971) also noted that quieting technologies could reduce typical front-end loader noise levels by 4 dBA, to 75 dBA. Two of these reports offer some insights into the range of noise levels from different front end loaders. Bender (1971) offers a range of 73-84 dBA from an unspecified number of machines. Toth (1979) lists the quietest of 19 units measured at 78 dBA, and provides the minimum value from 24 units in an equipment survey as 79 dBA. In order to capture the probable range of front-end loader noise, a value of 67 dBA will be retained from the Environ report, and 73 dBA as a representative value from the three published sources.

Oyster Tumbler

DBOC operates an oyster tumbler, an inclined perforated metal tube more than 10 feet long driven by an electric motor. Oysters are dumped by hand into the upper end of the tube, and tumble down the tube, falling out through holes as they are separated from clusters. Environ reported a peak level of 59.4 dBA and a L_{eq} of 49.8 dBA for 2 minutes of operation under unspecified conditions. The figure on page 10 of Appendix B shows 1 second L_{eq} values ranging from 47 to 55 dBA, and Photo 4 on page 3 suggests that the electric motor is the primary noise source. In order to cross-validate these measurements, a portable cement/mortar mixer was selected as comparable because it slowly rotates stones and gravel in a metal cylinder. Army (2004) specifies a representative level of 82 dBA and a minimum value of 75 dBA. Accordingly, the values of 50 dBA and 75 dBA will be retained for analysis in Chapter 4.

Noise Spreading

The noise level arriving at any listening position will depend on the distance and the path traveled by the noise. In most environments, sound levels fall off with the square of distance from the source (spherical spreading loss); spherical spreading loss alone causes a 20 dBA reduction in level with every tenfold increase in distance, or an approximate 6 dBA reduction for every doubling of distance. In addition to spreading loss, absorption and scattering cause losses that are directly proportional to distance. Note that the temperature inversions may form when the water of Drakes Estero is substantially colder than the ambient air. Under these conditions, sounds can travel much farther over water than would be predicted by spherical spreading loss. Topography can affect sound transmission through air. Intervening terrain can greatly reduce sound transmission. Further losses can be caused by the interaction of the noise with the ground surrounding the listener's position.

Wind conditions also have the potential to impact noise levels. Wind increases the natural background sound level. Wind also causes sound to bend away from the ground in the upwind direction and towards the ground in the downwind direction. Therefore, sounds may carry farther downwind – and less far upwind – than would be predicted by spherical spreading. Strong winds inhibit formation of the temperature inversions. The prevailing winds in Drakes Estero are from the northwest, so noise will carry farther to the southeast of noise sources.

The actual sound levels at a particular receptor would be calculated based upon reference sound level data, the noise paths between the source and the receptor location, and the attenuation of sound levels over distance (FTA 2006). The closest weather station to the project area is at the Point Reyes RCA Station, approximately 1.3 miles from the DBOC onshore operations. Average daily wind speeds over 2010 and 2011³ have ranged between 2.75 miles per hour (mph) on October 21, 2011, and 28.54 mph on April 21, 2010, with an overall daily average of 9.06 mph. Approximately 68 percent of days during 2010 and 2011 had an average daily wind speed of less than 10 mph. Average daily air temperatures varied between 39.0 and 63.2 degrees Fahrenheit, with a maximum of 79.3 degrees and a minimum of 30.6 degrees (Western Regional Climate Center 2012).

Underwater sound levels at Drakes Estero have not been monitored by NPS, but several qualitative factors suggest that its natural underwater sound levels would be unusually low for a shallow marine ecosystem, for the following reasons. First, the relatively small expanse of Drakes Estero prevents generation of any substantial waves by wind. Second, this area is free from underwater sounds of breaking surf. Third, the narrow entrance and shallow bottom of Drakes Estero will prevent most sound originating outside of the system from intruding.

Underwater soundscapes are generally more heavily affected by motorized boats than the above water environment. Sound generally travels much farther in water than in air due to much lower absorption, less effective terrain shielding, and the potential confinement of sound energy between two reflecting layers (the surface and many types of bottom). Given the underwater noise levels of small boats with outboard motors (Kipple and Gabriele 2003, 2004) and the characteristics of underwater sound propagation, underwater noise impacts from these boats can propagate on the order of 6 miles (Hildebrand 2009).

HUMAN AND WILDLIFE RESPONSE TO NOISE

The contribution of human-caused noise to the natural soundscape has the potential to impact wildlife and visitor use of the project area as well as the wilderness values of Drakes Estero. Noise has similar adverse effects on humans and wildlife. Noise interferes with sleep and communication, and it can present distraction or interference for other activities. Noise also interferes with hearing, preventing wildlife and humans from perceiving sounds they otherwise would have heard. Noise also causes physiological responses, and chronic exposure has been shown to elevate the risk of hypertension and stroke in humans (Jarup et al. 2008). Noise has been shown to annoy humans, though the degree of annoyance is idiosyncratic. Humans vary in their sensitivity to noise. Subjective responses to noise also depend upon the context.

³ Data is not available for August 19 and 20, 2011.

Numerous surveys have documented the importance of park soundscapes to visitors. In the context of park noise management, it is important to characterize the resources and activities that are essential to the park's purpose (NPS 2000). Ninety-one percent of park visitors consider enjoyment of natural quiet and the sounds of nature as compelling reasons for visiting National Parks (McDonald, Baumgartner, and Ichan 1995). Escaping noise ranks fourth in importance (behind enjoying nature, physical fitness, and reducing tension) among sixteen preference domains by users of wilderness and nonwilderness recreational areas (Driver, Nash, and Haas 1987). Note that enjoying nature and reducing tension are both plausibly related to noise-free environments. Ninety-five percent of all Americans regard opportunities to experience natural peace and the sounds of nature as an important reason for preserving national parks; 72 percent thought it was very important (Haas and Wakefield 1998). In nearby Muir Woods, park visitors were overwhelmingly supportive of declaring a “quiet zone” in Cathedral Grove, and signs asking visitors to preserve this quiet place were successful in reducing noise energy by half (Stack et al. 2012).

In the context of community noise management, some agencies have utilized laboratory studies of perceived loudness to interpret the effects of elevated levels of background sound. This practice has produced the generalization that a 10 dBA increase is perceived as roughly twice as loud. This subjective interpretation has several problems that discourage its application in national park settings. To illustrate its most serious defect, consider that a 10 dBA increase in noise exposure is produced when the number of noise sources is increased ten-fold. The subjective loudness interpretation asserts that ten times as many sources sound twice as loud, and one hundred times as many sources sound four times as loud. These assertions cannot be supported by science or everyday experience. In the dose-response studies where sound level is related to annoyance, the fraction of the community expressing annoyance roughly doubles with every 6 dBA of increase in noise level (ANSI 2008; ISO 2003).

Table 3-4 below provides reference points for how different sound levels can affect the ability for humans to communicate vocally. A normal speaking voice is approximately 65 dBA.

TABLE 3-4. EFFECTIVE COMMUNICATION DISTANCES

Sound Level (dBA)	Approximate Distance at which Vocal Communication Becomes Difficult (feet)
30 dBA	59
40 dBA	18
50 dBA	10
60 dBA	5
70 dBA	3
80 dBA	2

Source: EPA 1981, Fig. 4-3, noise limits for “communicating voice”

Given the wilderness context for evaluating effects in Drakes Estero, more appropriate measures of acoustical environmental quality address the capacity to hear natural sounds, or the capacity for park visitors to communicate without raising their voices. One useful index is the change in the maximum distance at which a sound can be detected (Barber, Crooks, and Fristrup 2010). By this measure, a 10 dBA increase in background sound levels reduces detection (or communication) distance to $1/\sqrt{10}$ of its original value, a 68 percent reduction. The area in which this sound could be heard is correspondingly reduced by 90 percent. This metric may be applied to wildlife and human perception of natural events, as

well as to speech communication by park visitors. The only qualification applied to this metric is that the animal's hearing threshold must be lower than the natural ambient sound levels. This is true for many wildlife species, and all humans with normal hearing.

Wilderness areas are valuable for their undeveloped character, where humans are visitors and do not remain. Wilderness areas are also valuable as an opportunity for solitude. These values are articulated in the Wilderness Act (PL 88-577) and reiterated in related policies such as NPS *Management Policies 2006* and *Director's Order 41: Wilderness Stewardship* (DO-41) (NPS 2006d, 2011b). The noise from DBOC operations can detract from these values. The sounds serve as evidence of man's imprint on the natural landscape and can disrupt opportunities for solitude. Similarly, visitors wishing to enjoy a natural experience within the congressionally designated potential wilderness of Drakes Estero may not welcome these disturbances; noise may reduce visitor enjoyment of recreational use of the project area. For additional background on wilderness qualities, please see the "Impact Topic: Wilderness" section.

In general, wildlife species can be very sensitive to sound, as animals often depend on auditory cues for hunting, predator awareness, sexual communication, defense of territory, and habitat quality assessment (Barber, Crooks, and Fristrup 2010). Negative behavioral and habitat-use consequences of higher ambient sound levels from human voices, along with sound events associated with human activities (motorists, hikers), have been observed in many species both at individual and population levels (Frid and Dill 2002; Landon et al. 2003; Habib, Bayne, and Boutin 2007). Human activities can disturb harbor seals at haul-out sites, causing changes in harbor seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011). Further, there may be impacts on harbor seals related to underwater sounds produced by DBOC based on previous research on other marine mammals (NAS 2003).

The diversity and population of many bird species decrease in locations closer to a road or other sources of mechanized sound, which is described as the "road effect" (Francis, Ortega, and Cruz 2009). This effect is often attributed to mechanical noise levels rather than to decreased habitat quality or direct mortality caused by vehicle collisions (Reijnen et al. 1995; Rheindt 2003). Additional detail on the ways in which sound levels impact wildlife can be found in the separate impact topic sections on wildlife and wildlife habitat.

IMPACT TOPIC: WILDERNESS

The Wilderness Act (PL 88-577) was passed on September 3, 1964, to establish a national wilderness preservation system made up of designated wilderness areas. Point Reyes National Seashore is one of 46 units within the national park system that include congressionally designated wilderness areas.

Wilderness areas are defined, in part, as follows:

An area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation. (PL 88-577)

Section 3(c) of the Wilderness Act required that the Secretary of the Interior review “every roadless area of five thousand contiguous acres or more” within the national park system and report to the president his recommendation as to the suitability of these areas for preservation as wilderness. The president is then to advise Congress of his recommendation with respect to the designation of each area. A presidential recommendation for designation as wilderness becomes effective only if so provided by an act of Congress (PL 88-577).

In 1972, the Seashore published its initial wilderness recommendation for an area of about 5,150 acres for the purpose of preservation of wilderness areas. As required by the Wilderness Act, a public hearing was held on the preliminary wilderness proposal for the Seashore at the Marin County Civic Center in San Rafael, California, on September 23, 1971. A total of 211 people attended, and a total of 4,658 responses to the proposal were received (NPS 1972b). Public comments received were varied. Several nationwide conservation groups (such as the Sierra Club and the National Parks Conservation Association [NPCA]) felt that the wilderness acreage proposed was not large enough. Seven organizations, mainly equestrian groups, supported the initial 5,150-acre proposal (NPS 1974).

Following the 1972 wilderness recommendation, the Seashore developed a final environmental statement (NPS 1974). The environmental statement analyzed a number of areas in the seashore with a range of alternatives including no wilderness, less wilderness, and more wilderness (NPS 1974). The final environmental statement was published in 1974 and recommended 10,600 acres of proposed wilderness.

In 1976, Congress designated more than 33,000 acres, including 25,370 acres as wilderness and another 8,003 acres of land and water as potential wilderness (PL 95-544, October 18, 1976, 90 Stat. 2515 and PL 94-567, October 20, 1976, 90 Stat. 2695). While the legislative language clearly articulates the acreage above in section 1, the map filed with the committee as required under section 2 of the legislation calculated that the actual acreage of those lands and waters are 24,200 acres of wilderness and 8,530 acres of potential wilderness. Potential wilderness was designated at the time due to nonconforming Wilderness Act uses in those areas. Nonconforming uses are uses that are prohibited by the Wilderness Act. The Point Reyes Wilderness was renamed the Phillip Burton Wilderness in 1985 (PL 99-68).

Congress established the process whereby potential wilderness within the Seashore would convert to designated wilderness in section 3 of PL 94-567. This process requires publication in the Federal Register of a notice that all nonconforming uses have ceased. On November 18, 1999, in accordance with this process, a notice was published in the Federal Register that nonconforming uses of the lands located in the Muddy Hollow, Abbotts Lagoon, and Limantour (including southern Drakes Estero) areas had ceased. For instance, following the Mount Vision fire, power lines were removed from the Muddy Hollow corridor and power is now provided to the Limantour area by underground power lines located outside congressionally designated wilderness (along Limantour Road). As a result, 1,752 acres of the potential wilderness designated in 1976, including the waters of Estero de Limantour and the offshore waters off Limantour Spit, were converted to wilderness, bringing the total area of designated wilderness within the Seashore to 27,122 acres (NPS 1999a). The Phillip Burton Wilderness Area is unique in that it is the only wilderness area between Canada and Mexico that includes marine tide and submerged lands and waters (wilderness.net 2011).

Drakes Estero is included in the Phillip Burton Wilderness at Point Reyes National Seashore. Approximately 1,363 acres within the Estero remain potential wilderness due to the presence of DBOC’s commercial shellfish operations (figure 3-8). These commercial operations are referred to as

nonconforming uses and prevent the area designated by Congress as potential wilderness from attaining full wilderness status.

The Interagency Wilderness Character Monitoring Team, which represents the Bureau of Land Management, USFWS, NPS, U.S. Geological Survey, and the U.S. Forest Service, offers an interagency strategy to monitor trends in wilderness character across the national wilderness preservation system in the handbook *Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character across the National Wilderness Preservation System*.

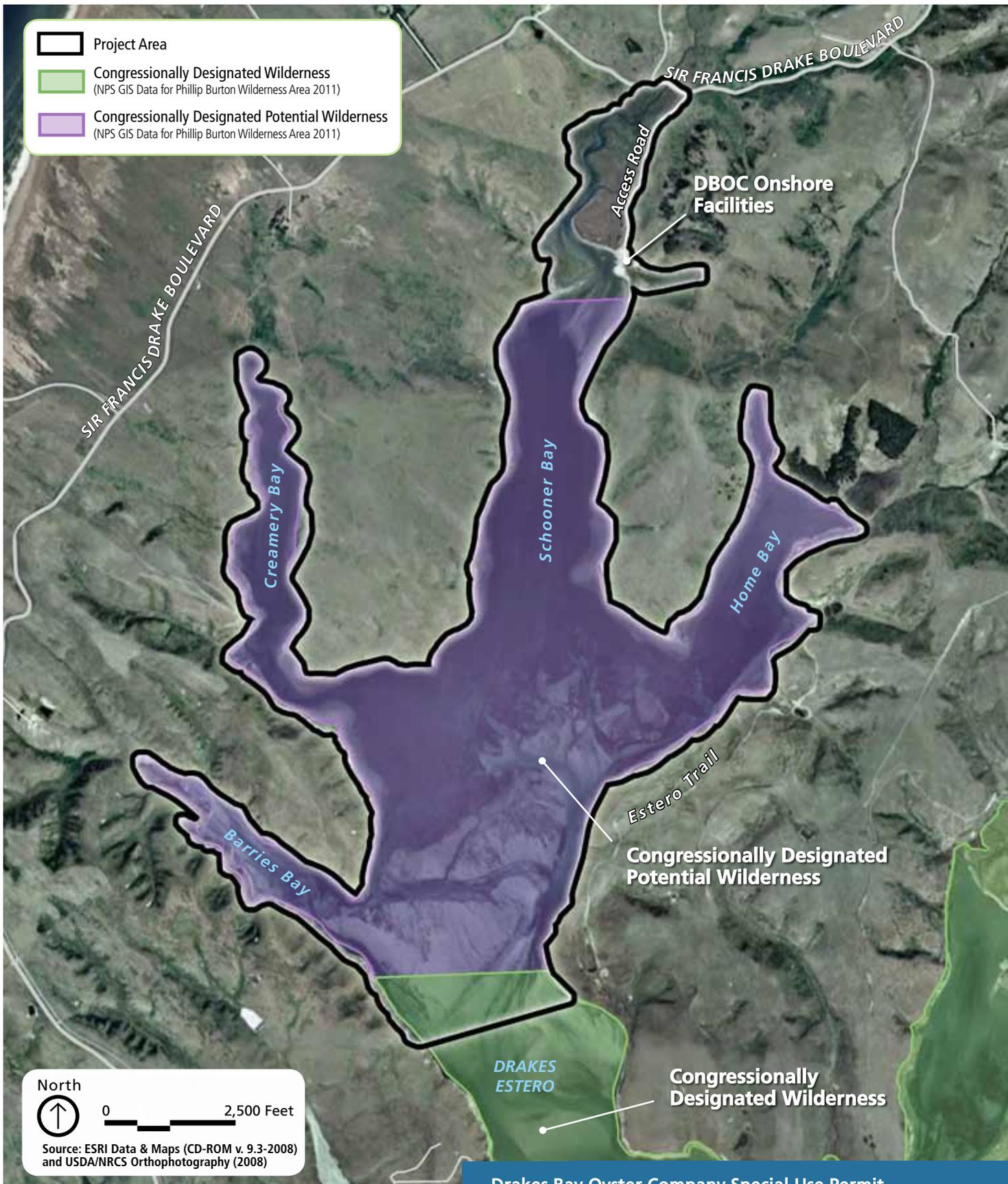
The interagency team outlines four qualities of wilderness from the statutory language of the Wilderness Act that should be used in wilderness planning, stewardship, and monitoring:

- **Untrammeled**—Wilderness is essentially unhindered and free from modern human control or manipulation
- **Natural**—Wilderness ecological systems are substantially free from the effects of modern civilization
- **Undeveloped**—Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation
- **Solitude or a primitive and unconfined type of recreation**—Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation (NPS 2011b; Landres et al. 2008)

Table 3-5 lists the nonconforming uses and structures in Drakes Estero which affect the wilderness qualities of Drakes Estero. A total of 95 wooden racks occupying approximately 7 acres (the length of the racks is approximately 5 miles when laid end to end) are currently installed in the Drakes Estero bottom and protrude from water's surface, especially during low tide. These items are evidence of the presence of modern human control or development within congressionally designated potential wilderness. The presence of mariculture-related structures and shellfish also alter the natural ecological systems of Drakes Estero. While some shellfish may occur within Drakes Estero naturally, the species and numbers being grown and the methods being used to grow them are dictated by human control and would not occur naturally. The mariculture infrastructure and the shellfish provide hard surface substrate in much greater abundance than would occur naturally. Furthermore, the predominant shellfish being produced is the Pacific oyster, a nonnative species in Drakes Estero.

The congressionally designated potential wilderness of Drakes Estero also offers Seashore visitors an outstanding opportunity for solitude, although use of noise-generating boats and other equipment and activities by DBOC staff interrupts this experience. For instance, DBOC intermittently operates motor boats approximately 8 hours a day within Drakes Estero. Additional detail on noise generation is contained within the "Impact Topic: Soundscapes" section, and additional detail on visitor experience is contained within the "Impact Topic: Visitor Experience and Recreation" section.

NPS infrequently requires the use of motorboats within the congressionally designated potential wilderness of Drakes Estero for management of Seashore resources. These activities are subject to minimum use requirements, which minimize impacts on wilderness areas.



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**FIGURE 3-8
Phillip Burton Wilderness**

TABLE 3-5. NONCONFORMING USES AND STRUCTURES AFFECTING WILDERNESS QUALITIES IN DRAKES ESTERO

Nonconforming Uses	Wilderness Qualities Affected
Overnight anchorage of barges used for commercial shellfish production in potential wilderness	Undeveloped (barges are evidence of human occupation)
Commercial activities associated with the shellfish operation including, tending of nonnative or nonlocal species of private cultured shellfish using racks, bags, trays, and other cultivation materials	Natural (trays and other culture material affect the natural ecosystem; presence of cultured species, particularly nonnative species, affects the natural ecosystem) Untrammeled and natural (bags cause human manipulation of natural sediment dynamics) Undeveloped (bags are evidence of human occupation)
Motorized boat operations for commercial shellfish operations	Natural (eelgrass damage and sediment disturbance from boat operations disrupt natural processes) Solitude (sound generated by motor boats distracts from opportunities for solitude)
Nonconforming Structures	Wilderness Qualities Affected
Shellfish growing racks	Undeveloped (racks are evidence of modern human occupation)
Anchors into substrate and lines to hold culture bags, including floating bags and bags placed on sandbars	Untrammeled (anchors and lines manipulate natural substrate)

Drakes Estero provides an outstanding opportunity for solitude and primitive, unconfined recreation. Hikers on Bull Point, Estero, and Sunset Beach trails enjoy expansive views of Drakes Estero, and kayaking is a popular recreational use of Drakes Estero. In compliance with the Wilderness Act, NPS does not allow any motorized boat traffic in Drakes Estero, with the exception of DBOC boats. DBOC boats are estimated to make approximately 12 round trips into Drakes Estero per day (DBOC [Lunny], pers. comm., 2011h). Motorboats in Drakes Estero and other human-related sound sources, such as pneumatic drills, contribute noise levels to an otherwise natural soundscape with ambient sound levels at approximately 34 dBA (Volpe 2011). Soundscapes are discussed in further detail under that impact topic. This results in an intrusion upon the solitude that is otherwise experienced by recreational visitors to Drakes Estero.

When the nonconforming uses within Drakes Estero cease, the process laid out in section 3 of PL 94-567 would be carried out in order to convert the congressionally designated potential wilderness to congressionally designated wilderness through the following process:

All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness. (PL 94-567, section 3)

Onshore facilities are currently located approximately 760 feet from the northern boundary of congressionally designated potential wilderness in Drakes Estero and approximately 2.5 miles north of the existing boundary between congressionally designated potential wilderness in the northern 1,363 acres of Drakes Estero and the congressionally designated wilderness at the southern mouth of Drakes Estero. The onshore DBOC facilities above the intertidal zone do not directly affect the Phillip Burton Wilderness; however, sounds emanating from onshore activities may disrupt the opportunity for solitude by disrupting the natural soundscape. This is discussed in additional detail under the impact topic of soundscapes.

IMPACT TOPIC: VISITOR EXPERIENCE AND RECREATION

Point Reyes National Seashore is located within 40 miles of the San Francisco metropolitan area, a major urban population center. The Seashore hosts more than 2 million visitors annually (NPS 2011m^{xxxvii}). According to visitor surveys conducted by Sonoma State University (Ferry and LaFayette 1997; Fungi 1999), most Seashore visitors spend two to six hours engaging in a variety of activities, depending on the season. Common activities range from whale watching and kayaking to hiking and bird-watching (Ferry and LaFayette 1997; Fungi 1999). Some visitors travel to the Seashore to visit DBOC, either as the sole reason for visiting or in conjunction with other recreational activities within the Seashore.

Pursuant to NPS *Management Policies 2006* (NPS 2006d) in general, preferred forms of visitor enjoyment are those that are uniquely suited to the superlative natural and cultural resources found in the parks. These preferred forms of use contribute to the personal growth and well-being of visitors by taking advantage of the inherent educational value of parks. Equally important, many appropriate uses also contribute to the health and personal fitness of park visitors. These are the types of uses that NPS will actively promote, in accordance with the NPS Organic Act.

Visitor services are different from the overall visitor experience in that they provide public accommodations, facilities and services that are necessary and appropriate for public use and enjoyment of the unit of the National Park System in which they are located. Visitor services also are consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the unit (16 U.S.C. 5951(b), 5952; 36 C.F.R. 51.3) (definition of “visitor service”). In contrast, the primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not services being offered to the visiting public to further the public’s use and enjoyment of the Seashore. As such, although DBOC may be considered to provide an experience for some visitors, it does not provide a visitor service. Pursuant to NPS *Management Policies 2006* (NPS 2006d), concession contracts may only be awarded for certain, defined types of commercial operations which do not, and cannot, include commercial shellfish operations. Concession contracts are limited, as a matter of law, to visitor services, which DBOC does not provide.

Visitors to the area use Drakes Estero and its environs for a variety of recreational activities. For example, Drakes Estero is open annually to kayakers from July 1 to February 28. Closures are in place from March 1 to June 30 to protect harbor seals during pupping season though the public may still access the shoreline of Drakes Estero. Visitors wishing to kayak in Drakes Estero may park in the NPS-maintained gravel parking lot adjacent to the DBOC facilities. This lot is relatively small, generally serving only a few vehicles at a time, with a maximum capacity of about 15 vehicles in unmarked spaces. The lot provides access to a sandy beach at the headwaters of Schooner Bay where visitors launch their kayaks.

In addition to individual kayakers, approximately 10 operators currently hold commercial use authorizations from the Seashore to offer kayak equipment rentals and/or guided tours within the Seashore. In 2010, three of the authorized kayak operators reported providing tours in Drakes Estero. In total, 221 visitors (NPS 2010g) were accommodated on these tours during the 8-month period Drakes Estero is open to kayakers (approximately 0.01 percent of total Seashore visitation that year). Data is not available to provide the total number of individual kayakers (i.e., not part of a commercial group) that use

Drakes Estero annually. Drakes Estero, which is congressionally designated potential wilderness, offers visitors such as kayakers and hikers an outstanding opportunity for solitude while enjoying primitive and unconfined recreation. This is a hallmark quality of a designated wilderness area. Such a wilderness experience, however, is currently subject to interruption by motorized boat traffic, handheld pneumatic drills, radios used by staff for music, and other generators of noise associated with DBOC operations. A more in-depth description of the soundscapes within the project area can be found in the “Soundscapes” section of this chapter. Additional background on wilderness qualities can be found in the “Impact Topic: Wilderness” section.

Several Seashore trails provide expansive views of Drakes Estero for hikers. The Bull Point Trail is 1.8 miles long and skirts Creamery Bay on its way to a terminal overlooking the main body of Drakes Estero. The Estero Trail travels 9.4 miles through open grassland. It offers outstanding views of Drakes Estero and Estero de Limantour and of the locally rich bird life (NPS 2011k). More than 35,000 visitors a year use this trail (NPS 2011k). Sunset Beach Trail branches off the Estero Trail to follow the bluffs bordering the eastern shores of Drakes Estero to Sunset Point. During low tide, the presence of oyster racks, bags, and motorized boats associated with DBOC operations are readily apparent to those visitors viewing Drakes Estero from these trails.



The front of the DBOC building generally known as the processing plant provides retail and interpretive space. (Photo courtesy of VHB.)

In 2003, 418 residents of Marin, Sonoma, Alameda, Contra Costa, and San Francisco County were randomly surveyed to gather information about the Seashore, from the perspective of local residents. When asked to identify why a national park is important, the respondents felt that protection of wildlife, protection of rare species of plants and animals, and preservation of native ecosystems were most important to national parks (Responsive Management 2003). Although they felt the ability to kayak, horseback ride, and bicycle within the Seashore were equally important, 92 percent reported recreational activities, in general, are an important component of national parks (58 percent felt it was very important) (Responsive Management 2003). Respondents most commonly reported that they would like increased wilderness areas and more educational opportunities related to Native American cultures and exploration and settlement history at the Seashore (Responsive Management 2003). Additionally, 82 percent of those who had visited the Seashore felt it would be very important to maintain the wilderness experience for future visitors to the Seashore (Responsive Management 2003). The respondents were generally divided regarding the amount of wilderness at the Seashore, with 43 percent identifying that they would like to see more wilderness at the Seashore, and 38 percent reporting it should stay the same (Responsive Management 2003). At the time of the survey, Drakes Estero was already designated as potential wilderness (pursuant to PL 95-544, October 18, 1976, 90 Stat. 2515 and PL 94-567, October 20, 1976, 90 Stat. 2695).

Although not a visitor service, DBOC provides visitors with a different experience within the Seashore. DBOC estimates that 50,000 people visit its commercial operation each year (DBOC 2010n^{xxxviii}). This is approximately 2.5 percent of the annual visitation to the Seashore. These people may be visiting DBOC to

purchase shellfish directly at the on-site retail facility, picnic on-site, be part of an educational tour, or simply out of curiosity in passing. Educational tours are provided to a variety of groups, including schools, clubs, families, associations, and non-profits (DBOC 2010r^{xxxix}; Cummings 2011^{xl}). The tours provide DBOC visitors with the opportunity to gain a variety of knowledge including the history of agriculture and aquaculture in PRNS, the benefits of oysters (both as a local food source and within the coastal ecosystem), and sustainable aquaculture (DBOC 2010r^{xli}; DBOC 2011i^{xlii}). DBOC does not charge visitors for these tours (DBOC 2011i^{xliii}). DBOC also provides informational displays and the opportunity to experience an active commercial mariculture operation (DBOC 2010r^{xliiv}). As described in the “Impacts Topics Considered But Dismissed from Further Analysis” section of “Chapter 1: Purpose of and Need for Action,” while the oyster-growing facility in Drakes Estero is significantly associated with the rebirth and development of the California oyster industry in the 1930s, under Johnson Oyster Company ownership, the property is ineligible for listing in the National Register because it lacks historic integrity (SHPO 2011^{xliv}). However, visitors to DBOC are afforded an opportunity to learn about the history of the oyster industry, DBOC’s role in local traditions, and experience the associated working landscapes. Such an experience is not offered elsewhere at the Seashore (DBOC 2011i^{xlvi}). It is assumed that at least a portion of the visitors to DBOC only come to the Seashore to experience an active shellfish operation. However, data is not available to determine what percentage of DBOC visitors would fall into this category.

DBOC sells its oysters both wholesale and at a retail facility on site. It also sells other “seafood and complementary food items,” as authorized in the RUO. DBOC also supplies restroom facilities and telephones for visitors, is ADA accessible, as required by law, and has staff trained in cardiopulmonary resuscitation (CPR) and first-aid so they can assist in an emergency (DBOC 2011i^{xlvii}; DBOC 2011^{xlviii}; Cummings 2011^{xlix}).

IMPACT TOPIC: SOCIOECONOMIC RESOURCES

The social and economic environment of a region is characterized by its demographic composition, the structure and size of its economy, and the types and levels of public services available to its citizens. For the purposes of this EIS, socioeconomic resources are considered at three different levels or project areas: Inverness Census Designated Place (CDP), Marin County, and the state of California. Shellfish operations are dispersed throughout California and not concentrated within one county or region. Therefore, evaluating operations at a scale smaller than the state level would distort the role of that operation in the larger market. In addition, much of the available data related to the shellfish market is provided at a state level. In particular, production data provided by CDFG, the Pacific Coast Shellfish Grower’s Association, and an independent survey of the bivalve shellfish industry in California, which are compared to DBOC production levels in this section, are reported at the state level. As such, it was determined that the state level is the most appropriate scale for evaluating shellfish production in this EIS. Shellfish data at the county level is presented in this section for reference purposes only and is not considered to be representative of the larger market. All other socioeconomic resources considered in this section are discussed in terms of Inverness CDP and/or the County. Marin County includes Muir Beach, Stinson Beach, Bolinas, Olema, Inverness, Point Reyes, Marshall, and Tomales. As the nearest municipality to the project area, socioeconomic data from Inverness CDP best reflects the conditions within the project area and offers an appropriate comparison to overall Marin County data. Socioeconomic data specific to Inverness CDP is called out as appropriate, as a representation of conditions within the project area, and for comparison to the overall county data. Inverness CDP is located along the northeastern boundary of

the Seashore, adjacent to Tomales Bay (see figures 1-5 and 3-9). Seashore operations support the county and state economy through the hiring of staff, purchase of goods and services, contracting with concessioners to provide visitor services (such as kayak tours of Drakes Estero), and operating its campgrounds (NPS 2006a). In addition, the more than 2 million annual visitors to the Seashore contribute to the economy by spending money at local establishments such as hotels, restaurants, and retail shops (NPS 2011a; NAS 2009).

NPS developed the socioeconomic analysis using CDFG production data presented in the draft EIS, and updated by 2011 reported production. In August of 2012, after NPS had completed this analysis, including IMPLAN modeling, CDFG notified NPS that in May of 2012 it modified its methodology for estimating state shellfish production. NPS acknowledges these changes; however, because this data was received after completion of the socioeconomic analysis, and is not anticipated to result in significant changes to NPS findings or conclusions, it has not been incorporated in this EIS.

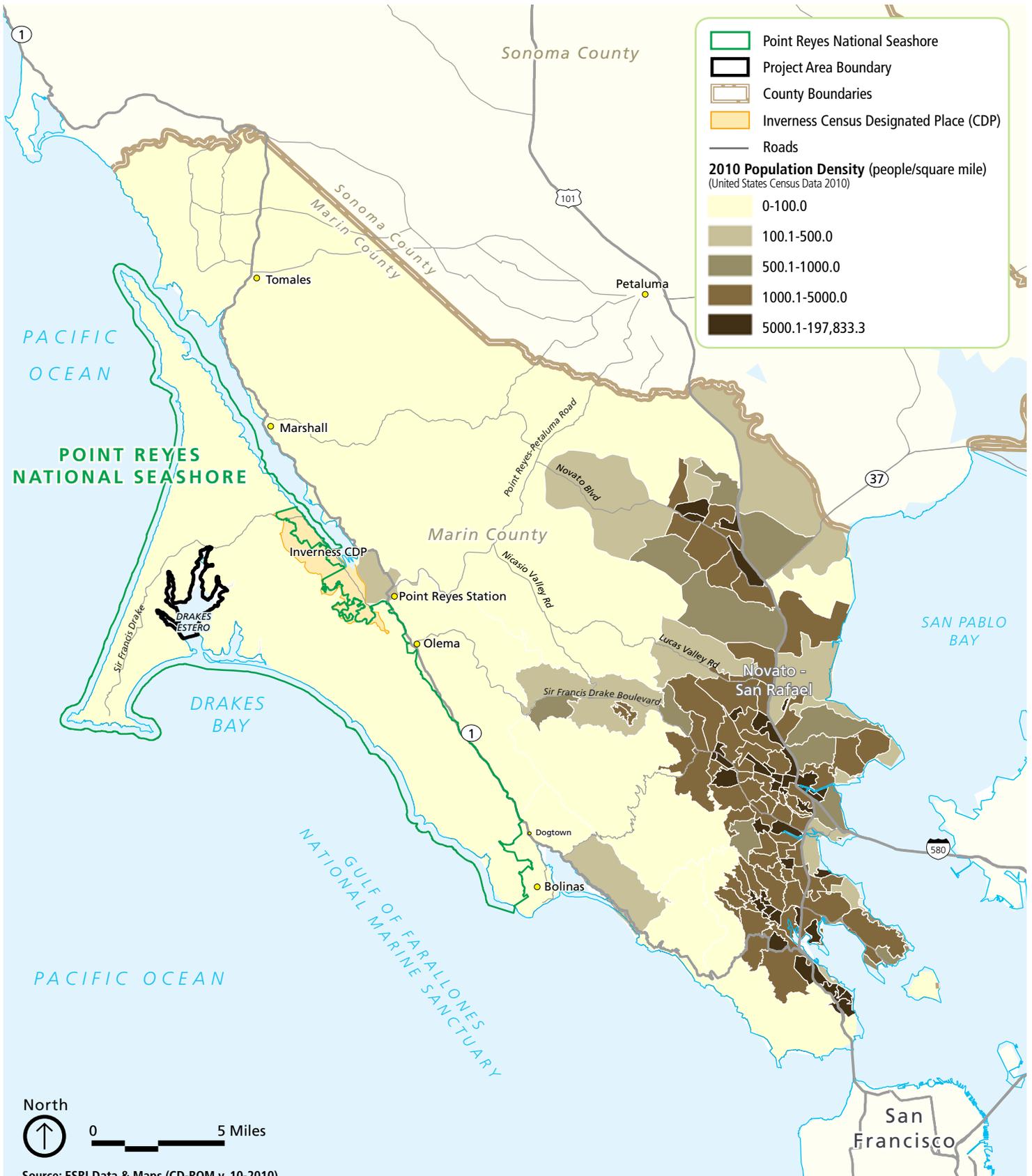
GENERAL SOCIOECONOMIC RESOURCES

Marin County occupies approximately 828 square miles, including 308 square miles of tidelands and submerged lands, just north of the San Francisco Bay in California. Much of Marin County's population resides in the eastern portion of the county (figure 3-9). Western Marin County, within which the Seashore and Inverness CDP are located, is primarily rural, with scattered, small, unincorporated towns that serve tourism, agriculture, and local residents. Inverness CDP occupies approximately 6.4 square miles including 0.4 square miles of tidelands and submerged lands.

Demographics

Much of the data presented in this section are from the U.S. Census Bureau, which places people according to "usual residence" guidelines, meaning where they live most of the year. Based on 2010 U.S. Census Bureau data, Marin County had 252,409 residents and a population density of approximately 485 people per square mile (U.S. Census Bureau 2010). In contrast, the population of Inverness CDP was estimated at 1,304 residents with a population density of 217 people per square mile, representing 0.5 percent of the overall county population.

Between 2000 and 2010 Marin County experienced a growth rate of 2.1 percent (U.S. Census Bureau 2010), while the population of Inverness CDP declined by 8.2 percent (U.S. Census Bureau 2000, 2010). In 2010, 95.8 percent of the county population reported only one race, with 80.0 percent reporting white. During the same year, 97.5 percent of the Inverness CDP population reported only one race, and 92.9 percent of the population reported to be white. The ethnicities of the minority population in the county and Inverness CDP are summarized in table 3-6 and compared to the population of the state of California. As shown in the table, minority concentrations for Marin County and Inverness CDP are below statewide averages both as a whole and for each individual race.



North

 0 5 Miles

Source: ESRI Data & Maps (CD-ROM v. 10-2010) and United States Census Data (2010)

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**FIGURE 3-9
 Marin County Population Distribution**

TABLE 3-6. MINORITY POPULATIONS WITHIN MARIN COUNTY AND THE STATE OF CALIFORNIA

Race	Percent of Inverness CDP Population	Percent of Marin County Population	Percent of California Population ^a
Black	1.2	2.8	6.2
American Indian and Alaska Native	0.6	0.6	1.0
Asian	1.2	5.5	13.0
Native Hawaiian and other Pacific Islander	0.2	0.2	0.4
Some other race	1.5	6.7	17.0
Two or more races	2.5	4.2	4.9
Total minority	7.1	20.0	42.5

Source: U.S. Census Bureau 2010

a – According to U.S. Census Bureau data the total population of California was estimated at 37,253,956 in 2010.

In 2010, approximately 15.5 percent of county residents and 6.1 percent of the population in Inverness CDP identified themselves as Hispanic. For comparison, 37.6 percent of the population of California reports to be of Hispanic origin. DBOC reports that “22 of the DBOC employees are Hispanic” (DBOC 2011i¹). The concept of race is different than the concept of Hispanic origin. Therefore, the U.S. Census collects separate data on Hispanic and minority populations. Specifically, Hispanic is not considered a minority population by the U.S. Census and must be considered independently from race. For example, nearly half of the Marin County residents who reported to be Hispanic in 2010 indicated that their race was “white only.” The remaining 54 percent of the Hispanics within the county specified another race, stated they were of “some other race,” or indicated they were of two or more races (U.S. Census Bureau 2010). Those Hispanics that reported to be “white only” are not considered minority. Similarly, 51 percent of the Hispanic population in Inverness CDP reported to be “white only” (U.S. Census Bureau 2010).

Approximately 79.6 percent of the people living in Marin County are native to the U.S., with 49.0 percent born in the state of California (U.S. Census Bureau 2006-2010). In comparison, 87.5 percent of the Inverness CDP population is native to the U.S., and 57.2 percent is native to California (U.S. Census Bureau 2006-2010). Neighborhoods (represented as block groups) in the eastern portion of Marin County are the most densely populated regions in the county (U.S. Census Bureau 2010).

Employment

As noted above, western Marin County is primarily rural. Much of the employment in western Marin County, in particular, caters to tourists visiting the area. In 2010, the unemployment rate in Marin County was 8.3 percent, well below the statewide average of 12.4 percent (U.S. Department of Labor 2010, 2011). Between 2006 and 2010, Inverness CDP reported zero unemployment (U.S. Census Bureau 2006-2010).

Between 2006-2010, the labor force in Marin County was concentrated in educational services, health care, and social assistance (20.1 percent); professional, scientific, management, administrative services, and waste management (12.2 percent); retail trade (11.0 percent); and manufacturing (10.3 percent). Together, these sectors accounted for nearly 54 percent of the labor force within the county. Similarly, in Inverness CDP, the top four employment sectors between 2006 and 2010 were educational services,

health care, and social assistance (21.3 percent); construction industry (17.6 percent); retail trade (16.1 percent); arts, entertainment, and recreation, and accommodation and food service (9.2 percent); and finance and insurance and real estate and rental leasing (8.8 percent). The heavy concentration of retail trade; construction; arts entertainment and recreation; and real estate and rental leasing jobs reflects a local economy that is dependent on tourism. Agricultural jobs (agriculture, forestry, fishing, hunting and mining), which include jobs related to commercial shellfish operations, accounted for 0.7 percent of the labor force in Marin County and 2.2 percent of the labor force in Inverness CDP (U.S. Census Bureau 2006-2010).

The per capita income in Marin County between 2006 and 2010 averaged \$53,940, an approximately 20.0 percent increase since 2000. In comparison, the per capita income in Inverness CDP averaged \$47,688, a 27.7 percent increase since 2000. The per capita income for California increased approximately 28.5 percent during the same period (U.S. Census Bureau 2006-2010, 2000).

Tourism Contributions to the Economy

The economic benefits associated with the national park system are an indicator of tourism's contribution to the economy. In 2010, visitor spending within the national park system supported an estimated 258,400 jobs, approximately \$9.8 billion in labor income, and approximately \$16.6 billion in value added⁴. Additionally in 2010 visitor spending was estimated at nearly \$12.1 billion in local gateway regions around national parks (within a 60 mile radius of the parks and excluding park entry fees) (NPS 2011d). Approximately 81 percent of the total visitor spending (\$9.8 billion) was contributed by non-local visitors (NPS 2011d). NPS employees also contribute to the local economies because they typically live and spend money in the vicinity of the parks at which they work. In 2010, NPS employed over 26,000 staff with a combined labor income of approximately \$2.0 billion (NPS 2011d). This labor income equated to approximately \$2.2 billion in value added to the regions around the parks and approximately \$3.0 billion in value added to the national economy (NPS 2011d). Overall in 2010, NPS payroll-related spending was estimated to result in 300,000 national jobs; 189,000 of which (63 percent) are in the region surrounding national parks (NPS 2011d).

The Seashore is a large contributor to the economy of Marin County (NPS 2006a; NAS 2009). Specifically, in 2005, the Seashore generated \$5.3 million in tax revenue for Marin and Sonoma counties and \$2.9 million in tax revenue for the state of California (NPS 2006a). In 2010, the approximately 2 million recreational visitors to the Seashore contributed nearly \$85 million in local spending, approximately \$77 million of which was spent by non-local visitors (greater than 60 miles from the Seashore) (NPS 2011d). The non-local spending supported 981 jobs, approximately \$41.2 million in labor income, and nearly \$68 million in total value added for the local region (within 60 miles of the Seashore) (NPS 2011d). NPS payroll at the Seashore supported a total of 153 private sector and NPS staff in 2010 (122 NPS jobs). Maintaining these jobs resulted in approximately \$10 million in labor income and

⁴ Value added is a type of measure of Gross Regional Product and is the combination of wages, other property type income (corporate profits, capital, inventory) and indirect business taxes collected by business for government (e.g., sales taxes, excise taxes, licenses). It can also be defined as total sales net of the costs of all non-labor inputs. Among the measures reported here, value added is the preferred economic measure of the contribution of an industry or activity to the economy.

approximately \$12 million in value added for the region (NPS 2011d). This results in a total impact of approximately \$51 million in labor income and \$80 million in value added, approximately 0.5 percent of the county's total value added (MIG 2012, NPS 2011d).

DBOC's contribution to the regional, state, and/or local economy could not be determined at the time of report development. Specifically, data is not available regarding the number of visitors that come to the Seashore for the sole purpose of visiting DBOC (versus those who also visit other areas of the Seashore during their trip). Visitors to DBOC who also come to experience other areas of the Seashore would contribute to the regional, state, and local economy regardless of DBOC's presence, whereas, those who only travel to DBOC may or may not continue to come to the Seashore.

Housing

In 2010 there were approximately 111,214 housing units in Marin County, 1,102 of which were located in Inverness CDP. Approximately 103,210 of the housing units in the county (92.8 percent) were occupied. In contrast, 36.7 percent of the housing units within Inverness CDP were reported to be vacant, suggesting that several of the housing units within Inverness CDP are for seasonal, recreational, or other occasional use (U.S. Census Bureau 2010). This is consistent with Inverness CDP's location within the Seashore, a tourist destination.

Between 2006 and 2010, Marin County homes had an estimated median value of \$868,000. Median home values within Inverness CDP were consistent with those in the county, and were reported to be \$827,900 during the same period. The county had an estimated median monthly owner cost of \$3,416 for those with a mortgage (\$2,947 for Inverness CDP) and \$646 for those without a mortgage (\$487 for Inverness CDP). The median gross rent was \$1,523 per month for the county as a whole, while rents in Inverness CDP were slightly higher, at \$1,610 per month (U.S. Census Bureau 2006-2010).

COMMERCIAL SHELLFISH OPERATIONS IN CALIFORNIA

In 2010, the seafood trade deficit in the U.S., which includes net imports/exports of shellfish, reached over \$10 billion. Imports of shrimp, crab, tuna, salmon, and lobster are the primary contributors to the deficit (NAS 2010). The largest seafood exports in the U.S., based on value, are groundfish, salmon, and lobster (NAS 2010). Therefore, changes in U.S. shellfish production are "unlikely to make a significant difference in the nation's overall seafood trade balance" (NAS 2010). From a global perspective, shellfish cultivation has increased in recent years, despite declining fishery yields (NAS 2010). The most widely cultivated species of oyster is the Pacific oyster, which accounts for approximately 99 percent of the oyster produced globally each year (NAS 2010). Shellfish operations within the Pacific coast region (California, Washington, Oregon, and Alaska) contribute approximately \$110 million to that region's economy each year (PCSGA 2009).

In recent years, shellfish producers across the country, including those in California, have struggled to meet shellfish demands (PCSGA 2011^{li}). The state of California encompasses approximately 30 marine aquaculture operations, including 23 commercial shellfish operations (CDFG [Ramey], pers. comm., 2011d). Some operations are located on state-owned lands (including tidelands and submerged lands and land-based operations) while others are located on tidelands and submerged lands under the jurisdiction of

other governmental entities or private parties. State management by CDFG of these operations differs based on the operation's location. To assess the California shellfish market, and DBOC's role in that market, sales data was reviewed from a variety of sources as follows:

- In 2007, the 23 commercial shellfish operations in California (operating on a combination of state-owned, granted, and private tidelands and submerged lands) produced and sold molluscs, such as abalone, clams, mussels, and oysters (USDA 2009). These operations accounted for over \$11.7 million in product sales.
- Four commercial mariculture operations were reported to produce and sell shellfish in Marin County in 2007, comprising approximately \$2.3 million in product sales (USDA 2009).
- A 2009 independent evaluation of bivalve/mollusk culture (not including abalone) indicated that 15 active shellfish companies operated in California in 2007/2008 and sold \$16.5 million in live products (Kuiper 2009). According to the 2009 survey, these bivalve operations accounted for 208 jobs and \$1.7 million in government fees, licenses, state and federal taxes (Kuiper 2009). "For every one dollar generated in profit by these farms, one dollar was paid to the government" (Kuiper 2009).
- Data provided by the Pacific Coast Shellfish Grower's Association indicated that in 2008, California oyster and clam sales totaled approximately \$12.4 million and \$830,000, respectively (PCSGA 2009).
- In 2010, the gross value of aquaculture production in Marin County was approximately \$4.26 million, 7.6 percent of the gross value of agricultural production in the county (MCDA 2011).
- The U.S. Census Bureau reported that oysters produced in the U.S. in 2008 were valued at nearly \$131.6 million (U.S. Census Bureau 2012).
- The sales reported in the Census of Agriculture include the value of aquaculture distributed for restoration, conservation, or recreational purposes (USDA 2009).

In California, CDFG manages 18 leases for 9 shellfish operations, including the 2 leases at DBOC. With the exception of DBOC, these operations are located on state-owned tidelands. CFGC issues state water bottom leases pursuant to the Fish and Game Code, on state owned tidelands. CDFG then administers the leases for CFGC and collects revenues from the leaseholder. Lessees pay an annual per-acre rental fee and a privilege use tax to CDFG. These fees help support CDFG oversight efforts, but do not cover all associated costs. The leaseholders also maintain an aquaculture registration with CDFG. CDFG also coordinates with the shellfish hatcheries on disease and health certifications, although the California Department of Public Health is the primary agency responsible for certifying growing areas for shellfish.

There are approximately 19 aquaculture operations in the state on granted or private tidelands and submerged lands or are private land-based operations, not owned by the state of California (CDFG [Ramey], pers. comm., 2011d). Nine of these operations are on granted or private tidelands and 10 are land-based facilities. With the exception of Drakes Estero, CFGC does not issue leases for aquaculture operations located on granted or private tidelands and CDFG does not collect lease fees or privilege use taxes from these operators. Rather, these operators make payments to the entity that holds title to the tidelands and submerged lands on which they operate. These operators maintain an aquaculture registration with CDFG; however, they do not pay other fees or taxes to CDFG.

One example of the type of regulatory oversight that exists for aquaculture operations on granted tidelands is found with the Humboldt Bay Harbor, Recreation, and Conservation District (Harbor

District), which was established in 1973 under the Humboldt Bay Harbor, Recreation and Conservation Act of 1970. Subsequently, the state of California granted all its tidelands and submerged lands to the Harbor District, reserving to the state “the right to fish in the waters on said lands with the right of convenient access to said water over said lands for said purpose.” The Harbor District owns the tidelands upon which operations take place and the District, not CDFG, issues leases to the aquaculture businesses. The Harbor District collects lease payments (typically per acre) and a per gallon tax similar to the use tax collected by CDFG for CDFG-managed leases.

According to a recent study prepared at Oregon State University, “demand for oysters does not seem to be income elastic or vulnerable to economic shocks like those associated with the recent recession” (Sorte 2010). An additional report released by the Department of Agricultural and Resources Economics, University of California, Davis notes that demand elasticity for fish is -0.57, which is considered generally inelastic (Russo et al 2008). For the purposes of the UC Davis study, shellfish were considered as part of the fish category. Based on this information, demand for shellfish is generally unchanged, regardless of price fluctuations.

DRAKES BAY OYSTER COMPANY

Between 1979 and 2011, Pacific oyster production within Drakes Estero averaged 406,238 pounds (4.8 million individual oysters) (CDFG 2011c).⁵ Table 2-1 Shellfish Species Production by Year (1979-2011) provides a complete list of shellfish produced within Drakes Estero during that timeframe. As shown in the table, during the latter part of JOC’s ownership and during the first couple years of DBOC ownership (through 2006), oyster production within Drakes Estero was significantly lower than current conditions. In 2005, production rates did not meet harvest requirements (180,030 pounds, or 2.1 million individuals, for M-438-01) due to the transfer of the lease from JOC to DBOC. Since that time, however, Pacific oyster production has increased. Between 2007 and 2009, annual Pacific oyster production averaged 454,036 pounds (5.3 million individual Pacific oysters), and increased steadily in 2010 and 2011. In 2011 oyster production at DBOC was reported to be greater than 618,000 pounds (approximately 7.28 million Pacific oysters). The 2011 levels of production represent an approximately 36 percent increase over production rates between 2007 and 2009 (CDFG 2011c). In 2009, in addition to Pacific oysters, DBOC produced 423 pounds of Manila clams (12,690 clams). In 2010, Manila clam production at DBOC increased more than 60 percent to 684 pounds (20,520 clams) (CDFG 2011c). In 2011; however, clam production at DBOC dropped nearly 83 percent to 118 pounds (3,540 clams) (CDFG 2011c).

Gross revenue has been commensurate with oyster production levels; however, due to fluctuations in direct and overhead expenses between 2005 and 2009, net revenues have been variable. It should be noted that DBOC has requested all financial data related to the shellfish operation be kept confidential (DBOC 2012b^{lii}). Therefore, the following discussion does not include specific revenue data. According to DBOC, both the gross and net revenue projected for 2010 were expected to be greater than any year since 2005 (DBOC 2010i^{liii}). Specifically, DBOC’s November 15, 2010, letter to NPS regarding the oyster company’s business plan states, “DBOC’s financial projection is that income and expenses will approximate the income and expenses over the past 2 years” (DBOC 2010i). The actual revenue data for

⁵ This data was derived using the most current tax records on file with CDFG. It should be noted that the data presented in the NAS report used previous information “not supported by tax records that are on file with CDFG.”

2010 had not been received from DBOC by the time of report preparation but is assumed to approximate that previously projected by DBOC. Revenue data for 2011 also were not available at the time of report preparation; however, based on the quantity of Pacific oysters produced, 2011 revenue is assumed to be greater than the annual revenue generated each year between 2005 and 2010. Revenue data prior to 2005 (associated with JOC) were not readily available.

DBOC states that its Pacific oyster products (and clams) are only distributed within an approximately 100-mile radius from its facility, and primarily to the San Francisco Bay Area and north (DBOC [Lunny], pers. comm., 2011h). Manila clams are currently sold on site and to select local restaurants only due to their limited production (DBOC [Lunny], pers. comm., 2011h). According to information provided by DBOC, approximately 25 percent of the shellfish produced annually at DBOC is sold in jars, while the remaining 75 percent is sold live in the shell (DBOC 2012b^{liv}). DBOC also reports that, based on value, approximately 40 percent of its shellfish is sold on site, 40 percent is sold to local restaurants and markets and delivered by DBOC directly, 18 percent is sold to Tomales Bay shellfish growers, and 2 percent is sold to seafood wholesalers and distributors (DBOC 2012b^{lv}). Other oyster companies close to DBOC that also contribute local oysters to the San Francisco Bay Area include Hog Island Oyster Farm, Tomales Bay Oyster Company, and Morro Bay Oyster Company.

Employment

As of November 2010, DBOC staff comprised 31 full-time employees and 1 part-time (seasonal) employee (total of 32 employees), 15 of who live with their families in company-owned housing (DBOC 2010j^{lvi}). These housing units are located within the onshore portion of the project area. DBOC maintains five housing units (with a total of 14 bedrooms) for its staff in the form of three double-wide mobile homes and two permanent houses (DBOC 2010k^{lvii}). Twenty-seven of DBOC staff live within Marin County. The remaining 5 employees reside in Sonoma County.

DBOC Contributions to the Economy

DBOC operates the only on site oyster cannery in the state of California; and according to DBOC, produces 100 percent of the state's shucked and packed oysters (DBOC 2010n^{lviii}). It should be noted that many oysters harvested from Humboldt Bay are shucked and packed by Coast Seafoods, but its facilities for shucking and packing are not in the state. Shellfish production at DBOC has been compared to statewide oyster production levels, based on data provided by CDFG. However, CDFG has acknowledged that its statewide production summaries do not accurately represent the total annual shellfish production in California. The available CDFG data are not inclusive of all statewide oyster production because some operations on private or granted tidelands are not accounted for in the totals as they are not required to report production data to CDFG. As discussed previously, CDFG manages 18 leases for 9 mariculture operations in California (out of a total of approximately 30 mariculture operations in the state). As such, DBOC contributions to the statewide Pacific oyster and total oyster markets are likely lower than the percentages presented in this document.

Additionally, production numbers for aquaculture operations under state-managed leases (approximately half of the operations in the state) are reported to CDFG in total numbers for most areas in California and that data gets converted into a weight in pounds. In contrast, Coast Seafoods, the largest producer in

Humboldt Bay, provides production information in gallons. Based on information provided to CDFG from Coast Seafoods, the number of Pacific oysters per gallon varies monthly and in 2007 alone ranged from 131 (December) to 257 (July) oysters per gallon (CDFG 2011e). In Drakes Estero, total numbers have been converted by CDFG into weight using a conversion of 100 oysters per gallon (CDFG [Ramey], pers. comm., 2011d). In other areas of the state, the total number of oysters has been converted by CDFG to weight using 140 oysters per gallon (CDFG [Ramey], pers. comm., 2011d). As a result, direct comparison of DBOC production with other areas may result in a 40 percent overestimate of production from Drakes Estero. In areas where production is not on state-managed leases, there are no standard reporting methods. Such inconsistencies are not unique to California as there is no federal standard for reporting shellfish production in the U.S (NAS 2010). CDFG has requested production information from those operations, but reporting is sporadic. In past years, CDFG used estimates of production. More recently, CDFG has only used reported production. As a result, reported production in Southern California has been reduced substantially (by 60,000 pounds of Pacific oyster and 500,000 pounds of mussels because previous estimates cannot be confirmed and there is no reported information for that location) (CDFG [Ramey], pers. comm., 2011d). In the 2009 producer survey (Kuiper 2009), Ted Kuiper, who also was a shellfish producer in Humboldt Bay, assumed 180 oysters per gallon for all oysters produced in California. For its analysis of statewide production CDFG has used the following assumptions:

For Tomales Bay:

- Pacific oyster/140 per gallon x 8.5 = pounds
- European flat oyster/140 per gallon x 8.5 = pounds
- Eastern oyster/300 per gallon x 8.5 = pounds
- Kumamoto oyster/300 per gallon x 8.5 = pounds
- Olympia oyster/400 per gallon x 8.5 = pounds

For Drakes Estero:

- Pacific oyster/100 per gallon x 8.5 = pounds

For Humboldt Bay:

- Pacific oyster/140⁶ per gallon x 8.5 = pounds
- Kumamoto oyster/300 per gallon x 8.5 = pounds

For Southern CA:

- Pacific oyster/140 per gallon x 8.5 = pounds

As described above, CDFG estimates of statewide shellfish production, including oyster production data, are not calculated consistently and are not inclusive of all statewide oyster production. Table 3-7

⁶ According to data provided by CDFG, Coast Seafoods, the largest shellfish producer in Humboldt Bay, estimates the number of Pacific oysters that comprise a gallon monthly, instead of applying a uniform conversion rate, such as 100 oysters per gallon. In 2008, Coast Seafoods averaged 154 Pacific oysters per gallon though values ranged from 132 Pacific oysters per gallon in January to 187 Pacific oysters per gallon in October. For the purposes of this EIS, a conversion rate of 140 oysters per gallon was assumed for all Pacific oysters produced in Humboldt Bay, including Coast Seafoods. This conversion rate is generally consistent with the annual average conversion rates for Coast Seafoods between 2007 and 2011 (158 Pacific oysters per gallon).

compares the shellfish production (2007/2008) within Drakes Estero to statewide shellfish production using three different sources: CDFG, an independent survey of California shellfish production by Ted Kuiper, and the Pacific Coast Shellfish Growers' Association.

According to CDFG records, in 2007 and 2008, Pacific oysters produced within Drakes Estero accounted for 37 percent of the Pacific oysters produced in California, approximately 35 percent of the overall oyster market for the state, and 33 percent of the shellfish produced in the state, based on weight. During the same timeframe DBOC's share of the Marin County Pacific oyster, total oyster and shellfish markets is substantially greater, comprising 69 percent, 68 percent, and 64 percent by weight, respectively (CDFG 2011e). Based on the number of individual oysters produced during these years; however, DBOC accounted for 30 percent of the Pacific oysters, 25 percent of the total oysters, and 24 percent of the total shellfish produced in California. DBOC's share of the California oyster market in 2009-2011 was generally consistent with 2007 and 2008. DBOC shellfish comprised an average of 31 percent of the Pacific oyster market, 24 percent of the state oyster market and 22 percent of the shellfish market, based on individuals, during the 2009-2011 timeframe (CDFG 2011c, 2011e). However, due to increased production in Tomales Bay, DBOC's share of the county oyster and shellfish markets was closer to 50 percent between 2009 and 2011 (CDFG 2011e). CDFG records indicate an average of nearly 1.2 million pounds (17.1 million individuals) of Pacific oysters and 1.3 million pounds (21.2 million individuals) of total oysters were produced annually in California between 2007 and 2009 (CDFG 2011a, CDFG [Ramey], pers. comm., 2011d). From a national perspective, in 2008, 30.1 million pounds of oysters and over 1 billion pounds of shellfish were produced in the U.S. (U.S. Census Bureau 2012). In 2009, the Pacific coast region produced approximately 9.9 million pounds of oysters, 8.6 million pounds of which were cultivated in Washington (NMFS 2011f).

The most significant increase in production at DBOC, between 2007 and 2011, occurred between 2009 and 2010. In 2010, DBOC produced 585,277 pounds of shucked oyster meat (6.89 million oysters), a 28 percent increase over 2009 production levels. During this same period, the California oyster market increased 43 percent. An increase in Pacific oyster production in Humboldt Bay was the primary contributor to this change (the California Pacific oyster market increased 48 percent, by weight, between 2009 and 2010) (CDFG 2011e). As described above, CDFG data are not calculated consistently and are not inclusive of all statewide oyster production. Therefore, it is assumed that DBOC's contribution to the overall California oyster market between 2007 and 2011 is lower than that reported by CDFG.

According to CDFG data, between 2009 and 2011, the total number of individual oysters produced in Drakes Estero was similar to production rates in Tomales Bay, which is also located in Marin County (CDFG 2011e). Tomales Bay includes shellfish production by six companies with a total of 10 leases (CDFG 2011f^{dx}).

According to CDFG data (CDFG 2011e), Manila clams harvested at DBOC in 2009 and 2010 represented only 1 percent and 0.04 percent, respectively, of the total Manila clams harvested in California those years. In 2011, Manila clam production at DBOC declined 83 percent compared to 2010 production, while statewide clam production only declined 20 percent. Manila clams were the only clams harvested in California in 2009 and 2010 (CDFG 2011a). Manila clam production at DBOC also is factored into the total shellfish percentages calculated for 2009 and 2010.

In addition to estimates provided by CDFG, statewide shellfish production data is available (for 2007 or 2008) from the Pacific Coast Shellfish Growers Association and within an independent survey of California's shellfish industry, prepared by Ted Kuiper (PCSGA 2009; Kuiper 2009). Table 3-7 summarizes the data available from these sources, and compares them to DBOC production and the shellfish production estimates reported by CDFG. As shown in the table, depending on the source and metric (individuals, weight, or value) used DBOC accounts for between 16 and 36 percent of the oysters and between 13 and 28 percent of the shellfish produced in California. The data from the Kuiper survey was calculated using the following conversion factors:

- 180 oysters compose a gallon
- One gallon of oyster meat weighs 8.5 pounds
- Twenty mussels weigh 1 pound
- Thirty clams weigh 1 pound

Kuiper reported data for the same operations as those represented in CDFG data. Kuiper assumes an average of 180 oysters per gallon and does not use the actual conversion rates for each operation. Since the conversion rates vary among operations, and can be as low as 100 or 140 oysters per gallon, this conversion rate may overestimate actual production rates. To account for this variation, DBOC's share of the statewide oyster market is presented as a range and is provided in term of individuals, weight, and value. In addition, the Kuiper survey considers imported oysters and clams; however, imported shellfish were removed from the calculations presented in table 3-7.

As shown in table 3-7, between \$8.8 million and \$12.4 million worth of oysters were produced in California in 2007/2008. This represents approximately 12-16 percent of the value of oysters produced in the Pacific coast region, which includes Washington, California, Oregon, and Alaska (PCSGA 2009). DBOC accounted for 3.4 percent of the oyster produced in the Pacific coast region in 2008 (PCSGA 2009, CDFG 2011a, 2011c).

TABLE 3-7. CALIFORNIA SHELLFISH PRODUCTION, 2007/2008

	DBOC ^{*, a}	CDFG ^{†, a}	Percent DBOC Contribution	Kuiper Survey ^{‡, b}	Percent DBOC Contribution	Pacific Coast Shellfish Growers Association ^{§, c}	Percent DBOC Contribution
Individuals							
Total Individual Oysters	5,314,005	21,173,960	25%	32,500,000	16%	N/A	N/A
Total Shellfish (individuals harvested)	5,314,005	22,549,820	24%	40,030,000	13%	N/A	N/A
Weight (lbs)							
Total Weight of Oysters (lbs)	451,691	1,306,032	35%	1,539,983	29%	N/A	N/A
Total Weight of Shellfish (lbs)	451,691	1,364,605	33%	1,895,983	24%	N/A	N/A
Value (Dollars)							
Total Value of Oysters [#]	\$2,484,301	\$8,847,028	28%	N/A	N/A	\$12,361,326	20%
Total Value of Shellfish [#]	\$2,484,301	\$9,063,627	27%	N/A	N/A	\$14,136,326	18%

Sources: [#]CDFG 2011a, [†]CDFG 2011c, ^{||}CDFG [Ramey], pers. comm., 2011d, [‡]CDFG 2011e; [‡]Kuiper 2009; and [§]PCSGA 2009.

N/A: not applicable; data not available

Note: In 2007 and 2008, DBOC produced only Pacific oyster.

a – Data shown is an average of production reported for 2007 and 2008.

b – Data shown is based on a combination of 2007 and 2008 production levels, depending on the year reported by each operation surveyed.

c – Data is for 2008 only, 2007 data was not available for California from this source.

In addition to its contribution to the local seafood market, the operation of DBOC has an impact on the overall local economy. An input-output methodology employing IMPLAN software (MIG 2012), originally developed by the US Government and the University of Minnesota, has been used to estimate the economic impact of DBOC operations on the Marin County economy. IMPLAN was chosen because of its ability to construct a model using data specific to Marin County while maintaining rich detail on impacts for hundreds of industrial sectors. In addition to being widely used in regional economic analysis, the model and its methodology have been extensively reviewed in professional and economic journals. IMPLAN software also was used to calculate the economic impacts of the Seashore on local communities (NPS 2011d).

Input-output models, such as IMPLAN, map the linkages of inter-industry purchases and economic output within a given region. These models trace the inputs necessary to produce a dollar of output for a specified industry in a given economy. This linked spending can be tracked through multiple rounds of spending to estimate the cumulative effect of a specific project or change in industry activity on a region's total output, earnings, and employment. The model factors how much of the required inputs can be supplied locally from within the project area and tracks spending until all money related to the original purchasing has been leaked out of the region or removed from the economy by savings, taxes and profits. If available, operation-specific payroll data can be input into IMPLAN to further refine results. The NPS has requested that DBOC provide payroll data for these purposes; however, DBOC did not provide this information. Instead, payroll was estimated by IMPLAN and considers the overall expenses and number of employees for DBOC and

industry averages. These direct effect expenditures were applied to the model in *Industry Sector 14 – Animal production, except cattle and poultry and eggs*. (This IMPLAN industry sector includes oyster production, farm raising [NAICS Code 112512] and was selected as the industry that most closely resembled DBOC activity. *Sector 17 – Fishing and Sector 61 – Seafood product preparation and packaging* were also considered and tested, but did not appear to provide as close a match in terms of reported financial and employment conditions).

In addition to the direct spending activity that is required to produce a dollar amount of a given product or service, economic impacts also occur as a result of “indirect” purchases that businesses and organizations make from other local industries using revenue gained from the initial direct spending. This is often referred to as “indirect spending.” “Induced spending” includes the purchases made by individuals and households within the project area as a result of the income they receive from the direct and indirect activity in the region. Input-output models yield “multipliers” that are used to calculate the total direct, indirect and induced effect on jobs, income and output resulting from a dollar of spending on goods and services in the project area. The direct, indirect and induced impacts from the annual operation of DBOC on the Marin County economy were modeled using the most recent available IMPLAN data (2010) and are summarized below. As stated previously, DBOC has requested all financial data related to the operation of DBOC be kept confidential (DBOC 2012b^{ix}). To adhere to this request, separate direct, indirect, and induced impact data generated by the IMPLAN model have been excluded from the EIS and only the total results are provided below.

The IMPLAN model indicates that, overall, Marin County economic activity includes a total value added of approximately \$17 billion. The top industry sectors in the county, based on employment are real estate establishments; food service and drinking places; and securities, commodity contracts, investments, and related activities. The top industry sectors based on output are real estate establishments; securities, commodity contracts, investments, and related activities; and state and local government (non-education) employment and payroll.

The estimates of DBOC impacts were produced by the IMPLAN model based on the reported estimate of 2010 gross sales and employment. These direct effect expenditures were applied to the model in *Industry Sector 14 – Animal production, except cattle and poultry and eggs*. Combined, the direct, indirect, and induced effects from the operation of DBOC support \$546,025 in labor income, approximately \$1.1 million in value added, \$2.0 million in total output, and 35 jobs within the county.

TABLE 3-8. IMPACT SUMMARY – DBOC OPERATIONS

Impact Type	Employment (Jobs)	Labor Income	Total Value Added	Output
Total Effect	34.9	\$546,025	\$1,117,575	\$2,026,982

Source: MIG 2012; *DBOC 2010^{ix}

Besides the industry sector containing oyster production, which is most affected by DBOC operations, other industry sectors reported by IMPLAN that see activity as a result of related spending include real estate establishments, food services and drinking places, agriculture/forestry support activities and wholesale trade businesses.

As described previously, the visitation and payroll associated with the Seashore accounts for 0.5 percent of the value added for Marin County. Value added from DBOC operations is equivalent to 1 percent of the Seashore's value added and approximately 0.006 percent of the county total.

DBOC reports that annual visitation for the oyster company is approximately 50,000 (DBOC 2010n^{lxiii}), approximately 2.5 percent of Seashore visitors (NPS 2011a). Specific data regarding the percentage of DBOC visitors that travel to the Seashore solely to visit the oyster company were not available at the time of report preparation; however, it is likely that many of the annual visitors to DBOC also visit other areas during their trip to the Seashore. All vehicle traffic to DBOC must travel over Sir Francis Drake Boulevard, which is monitored by the Seashore to estimate overall Seashore visitation. However, this approach does not provide an accurate measure of DBOC-only visitation because Sir Francis Drake Boulevard is a primary Seashore road that also connects visitors to a variety of popular sites within the Seashore, such as Drakes Beach, Point Reyes Beach, and Point Reyes Lighthouse.

Visitors to DBOC also are likely to spend their money locally at establishments such as restaurants, retail shops, and lodging facilities. This spending further contributes to the local and regional economy and increases the demand on local goods and services. The sales tax within Marin County currently ranges from 9 to 9.5 percent, and is 9 percent in the vicinity of the Seashore. Of this total, 7.25 percent is allocated to the state and the remaining 1.75 percent is dedicated to local funds. Information pertaining to the current impact of this spending on the local and regional economies was not readily available at the time of report preparation.

DBOC also donates and sells large oyster shells to native oyster restoration projects. As part of these efforts, DBOC recently donated an estimated \$10,000 worth of shells to the San Francisco Bay Bird Observatory (DBOC 2010n^{lxiii}). The oyster shells donated by DBOC have been used in wildlife habitat enhancement projects, to test, for example, whether predation of plover nests can be reduced by enhancing nesting habitat with oyster shells. Specific research efforts supported by DBOC, though the donation of oyster shells include, the San Francisco Bay Bird Observatory and the Berkeley Native Oyster Reef Project.

Due to the varying approaches used to estimate statewide oyster production rates and value in California, DBOC's share of the oyster and shellfish market is presented as a range in this document. In 2007/2008, shellfish harvested from DBOC comprised between 16 and 35 percent of the oysters and between 13 and 33 percent of the shellfish produced in California, depending on the source of the data and matrix used for comparison. These ranges are applied, as appropriate, throughout this document. However, because Manila clams were not harvested at DBOC until 2009 and CDFG is the only available statewide data for that year, DBOC's share of the statewide Manila clam market was estimated in comparison to CDFG data only.

IMPACT TOPIC: NPS OPERATIONS

Currently at Point Reyes (2010), there are approximately 120 FTE (full-time equivalent, or one person for a full year), including more than 90 permanent staff. During peak summer months, Seashore staff increases to about 160 staff members, including Youth Conservation Corps enrollees who provide assistance in a number of ways. This work force is supplemented by more than 40,000 hours of Volunteers-in-Parks, Student Conservation Assistants, and AmeriCorps service.

The Seashore maintains the necessary infrastructure to support annual visitation of more than 2 million people and provides offices, support structures, and limited housing for the permanent and seasonal Seashore staff. Park structures include the following:

- 3 visitor centers
- 3 research and environmental education centers
- 30 restroom complexes
- 4 backcountry campgrounds
- 2 beach campgrounds
- 1 volunteer campground at Bear Valley
- 27 water systems
- 147 miles of trails
- Over 100 miles of roads
- Over 100 public and administrative structures
- 55 sewage treatment systems
- 34 housing units

The Seashore also manages and protects its cultural resources, including the following:

- 361 historic structures
- 124 recorded archeological sites
- 39 identified cultural landscapes
- 516,074 museum objects

Financial resources available to achieve the Seashore's annual goals include a base operating budget of approximately \$7.8 million for 2010. In addition, the Seashore receives supplemental support for fire operations, routine maintenance, special natural resource projects, and repair and rehabilitation of structures. The management of Seashore programs, operations, and activities are categorized into one of several divisions, grouped into the following functional areas: facilities management, administration, visitor resource protection, natural resource management, science, cultural resource management, and interpretation and education.

Seashore-managed facilities in the vicinity of DBOC include an unpaved parking lot and associated split-rail wooden fence, the DBOC access road, a sign/interpretive kiosk, and a vault toilet. The parking lot is immediately north of the DBOC facilities and provides parking for the adjacent beach, which serves as a

boat/kayak launch for visitors. This lot is relatively small, with a maximum capacity of approximately 15 vehicles in unmarked spaces. The north and west sides of the lot are delineated by a split-rail wooden fence.

The maintenance of the road and parking area adjacent to DBOC are outside the boundaries of the existing permits or the ROU. Therefore, these facilities are under the authority and jurisdiction of NPS. As such, road maintenance, sign development and installation, and custodial maintenance of the vault toilet are conducted by Seashore staff, consistent with maintenance of all other NPS facilities. The DBOC access road is inspected regularly by NPS facilities management staff. DBOC has been asked to notify the facilities management division when any issues arise with the road. Grading has been conducted on an as-needed basis since 2007, approximately annually. NPS maintains a vault toilet installed in 2008 adjacent to and southeast of the beach parking lot. NPS conducts regular custodial maintenance of the vault toilet, totaling more than 100 labor hours annually. NPS maintains signs for the access road to be consistent with NPS sign policy. In addition, within the Seashore, NPS conducts trash removal on a weekly basis. DBOC pays NPS for the trash removal services.

Management and administration staff members at the Seashore have a variety of responsibilities related to DBOC management, including negotiation, management, oversight, and compliance for the DBOC SUP. In conjunction with the 2008 SUP, DBOC and NPS signed a statement of principles that, along with the SUP, indicates that NPS will cover costs associated with NEPA compliance required for the permit.

Over the past 5 years, management and administration costs for NPS have increased considerably because of Freedom of Information Act (FOIA) requests, heightened congressional and media interest, and local regional and national interest in the issues surrounding Drakes Estero. Since 2007, the NPS has received more than 100 FOIA requests related to DBOC. Administrative efforts necessary to address these includes review of the requests, collection of the requested documents/data, collation, and subsequent delivery/ mailing. Internal coordination associated with these requests has been managed by existing staff. NPS responses to the FOIA requests addressed to date are available for public review at http://www/nps.gov/pore/parkmgmt/planning_reading_room.htm.

Law enforcement and visitor resource protection staff are responsible for oversight of the RUO and SUP as well as enforcing all applicable regulations, including those related to species management and visitor protection. Duties related to DBOC management include regular check in, worker housing inspections, and response to calls as appropriate. Seashore staff are responsible for ensuring that closure policies within Drakes Estero are adhered to during harbor seal pupping season. Harbor seal pupping season occurs within Drakes Estero between March 1 and June 30. During this period, all recreational nonmotorized boats, including kayaks, are prohibited from entering Drakes Estero.

In addition to species-related law enforcement, Seashore staff are, in part, responsible for ensuring that DBOC housing conditions meet applicable standards. Annually, Seashore staff accompany the U.S. Public Health Service during inspections of DBOC employee housing units within the existing permit area. The Seashore responsibilities do not include monitoring or enforcement associated with other DBOC facilities or operations. Such inspections are conducted by CDPH.

Natural resource monitoring, management, and research are ongoing within Drakes Estero. Natural resource management staff members, with the assistance of volunteers, conduct inventories of various plant and animal species, as well as annual surveys for invasive species, including nonnative *Spartina*. Monitoring of the Pacific harbor seal has been ongoing in Drakes Estero since the early 1980s through a combination of Seashore staff and volunteers. Other regular monitoring efforts conducted onshore adjacent to the project area include archeological site surveys, threatened and endangered species surveys, and range management. Cultural resource management staff would be responsible for carrying out the archeological site surveys, while natural resource management staff would be responsible for performing the threatened and endangered species surveys and range management. Natural resource management staff is also responsible for preparation of all required annual reports for protected species, research on protected species or factors that could affect the species, predator control, and coordination of regulatory and scientific activities with other entities such as USFWS and CDFG.

Seashore staff have spent approximately 200 labor hours per year since 2008 for maintenance and custodial activities on facilities, including the Schooner Bay Road and vault toilet. Labor hours associated with administrative activities have exceeded 2000 hours per year, in association with SUP management and FOIA responsibilities. Under existing conditions, all maintenance, management, and administrative activities are accomplished with existing staff resources.

ENDNOTES

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- i. Anima 1990, 57: "Sediment in Drakes Estero ranges between medium grained sand to medium-fine silt, and varies slightly within each branching bay and the central Estero area."
- ii. Anima 1991, 42: "In the mid to upper parts of the branching bays, where silt becomes predominant, the tidal channels become less distinct to a point where mud makes up the tidal flats and the channels take on a meandering dendritic pattern and become very narrow and shallow."
- iii. Anima 1991, 42: "In Schooner Bay the channel is somewhat artificial in that it has been scoured out by the constant boat traffic from the oyster operation."
- iv. Anima 1990, 72–95: Sedimentation rates included in table 12 through table 17.
- v. Anima 1991, 64–75: Sedimentation rates included in table 12 through table 16.
- vi. Anima 1990, 87: "The geophysical records suggest that approximately 30 meters of sediment has filled the valley occupied by Drakes Estero near the entrance. [which] puts the onset of filling at 8,000 yrs B.P."
- vii. Anima 1990, 38: "The inlet to the Estero has migrated in an east to west [sic] and then reversed during historic times...During the course of this study, surveys were [sic] of the barrier spits were conducted and the barriers were found to have migrated approximately 80 meters in 1 year."
- viii. Wechsler 2004, 12–13: "A high width to depth ratio combined with a large exchange volume results in a well-mixed water body with no stratification."
- ix. Harbin-Ireland 2004, 27: "The organic matter input into the estuary with the breakdown of vegetative material from the eelgrass in the fall and winter when the sampling for this study took place likely accounts for the relatively high percent organic matter found in all sediment cores."
- x. Harbin-Ireland 2004, 27: "The organic matter input into the estuary with the breakdown of vegetative material from the eelgrass in the fall and winter when the sampling for this study took place likely accounts for the relatively high percent organic matter found in all sediment cores."
- xi. Harbin-Ireland 2004, 27: "The decrease in silt content values beneath racks in this study may indicate some sediment erosion is taking place due to the presence of the racks; however the difference is not likely great enough to alter invertebrate community composition."
- xii. Wechsler 2004, 13: "Aquatic macrophytes, primarily eelgrass (*Zostera marina*) beds, were the predominant form of subtidal and intertidal biological material in Drakes Estero."
- xiii. Anima 1991, 29: "Maximum water depths in Drakes Estero were found at the entrance and near the first major bend in the main channel west of the inlet, where the water depth is between 7.0 to 7.9 m."
- xiv. Anima 1991, 29: "The total area of the lagoon at higher high tide is 9.4 km². Of this area, approximately 4.8 km² consist of intertidal flats that are exposed during low tide."
- xv. Anima 1991, 29: "The total area of the lagoon at higher high tide is 9.4 km². Of this area, approximately 4.8 km² consist of intertidal flats that are exposed during low tide."
- xvi. Wechsler 2004, 13: "Aquatic macrophytes, primarily eelgrass (*Zostera marina*) beds, were the predominant form of subtidal and intertidal biological material in Drakes Estero. These beds provide an extensive array of habitat for aquatic biota, and are likely important breeding grounds and refuge areas for juvenile fish. Small zones of giant kelp (*Macrocystis pyrifera*) and big-leaf algae (*Ulva* spp.) were present in the Estero."

- xvii. Wechsler 2004, 13: "Aquatic macrophytes, primarily eelgrass (*Zostera marina*) beds, were the predominant form of subtidal and intertidal biological material in Drakes Estero. These beds provide an extensive array of habitat for aquatic biota, and are likely important breeding grounds and refuge areas for juvenile fish. Small zones of giant kelp (*Macrocystis pyrifera*) and big-leaf algae (*Ulva* spp.) were present in the Estero."
- xviii. Harbin-Ireland 2004, 46: "Appendix B. Invertebrate Taxonomic Groups and Species Found in Core Samples."
- xix. Wechsler 2004, 18: "I caught 3,128 fish, which represented twenty families and thirty-five species (appendix A)." "Five species, topsmelt (*Atherinopsis affinis*), three-spined stickleback (*Gasterosteus aculeatus*), staghorn sculpin (*Leptocottus armatus*), bay pipefish (*Sygnathus leptorhynchus*), and kelp surfperch (*Brachyistius frenatus*) dominated the fish assemblage and accounted for eighty-five percent of the total catch (Table 3)."
- xx. Wechsler 2004, 18: "only the data from the seven sampling periods from June 2003 through January 2004 were used for the statistical tests and descriptive accounts of the fish communities; this data incorporated 2,816 fish and twenty-nine species."
- xxi. Wechsler 2004, 23: "Table 6. Number of fish per ecological guild captured during the Drakes Estero Ichthyofauna – Oyster Mariculture study, Point Reyes National Seashore, December 2002 – January 2004."
- xxii. Wechsler 2004, 18: "Five species, topsmelt (*Atherinopsis affinis*), three-spined stickleback (*Gasterosteus aculeatus*), staghorn sculpin (*Leptocottus armatus*), bay pipefish (*Sygnathus leptorhynchus*), and kelp surfperch (*Brachyistius frenatus*) dominated the fish assemblage and accounted for eighty-nine percent of the total catch (Table 3)."
- xxiii. Wechsler 2004, 18: "It is likely that these five species are permanent residents of Drakes Estero, as they were collected during all sampling periods."
- xxiv. Wechsler 2004, 18-19: "Six species were intermediate in abundance, represented by greater than ten but fewer than one hundred individuals. The remaining eighteen species were captured in lower frequencies with total catch per species consisting of ten individuals or fewer."
- xxv. Wechsler 2004, 19: "Table 3. Relative abundance of the fish captured during the Drakes Estero Ichthyofauna – Oyster Mariculture Study, Point Reyes National Seashore, December 2002 – January 2004."
- xxvi. Wechsler 2004, 18: "Because of sampling difficulties encountered during the December 2002 and April 2003 sampling efforts, only the data from the seven sampling periods from June 2003 through January 2004 were used for the statistical tests and descriptive accounts of the fish communities;"
- xxvii. Wechsler 2004, 34: "Appendix A. List of all species captured during the Drakes Estero Ichthyofauna – Oyster Mariculture Study, Drakes Estero, Point Reyes National Seashore."
- xxviii. Anima 1990. Table 2, page 43. "Current Measurements"
- "Current measurements were taken just inside the mouth of the lagoon and along the straight portion of the main channel. Measurements were taken during the ebbing tide on August 16, 1986."
- xxix. Anima 1991, 38: Table 4. Salinity and Conductivity, measurements taken in Drakes Estero.
- xxx. Anima 1990. Page 94. "Water samples were collected from selected creeks during water years 1987-88, with the purpose of compiling data on the transport of plant nutrients to Drakes Estero and Ebbotts Lagoon."
- xxxi. Wechsler 2004. Appendices B "Environmental Characteristics Measured in Estero de Limantour and Schooner Bay, Point Reyes National Seashore (2002-2004)" and Appendix C "Water Column Variables Measured during the Drakes Estero Ichthyofauna – Oyster Mariculture Study, Point Reyes National Seashore (December 2002-January 2004)".

xxxii. Anima 1990, ii: "Based on interpretations made of geophysical records, Pb210, and Carbon14 dating techniques the study determined that sediment input into the Drakes Estero and Abbotts Lagoon has fluctuated over the last 8,000 years B.P. from 35 cm/100 yrs to between 12 cm/100yrs to 30 cm/100yrs over the last 120-150 years."

xxxiii. Anima 1990, 140: "Comparison of Pb210 age dates and those of c14 suggest that sedimentation has increased in the last 150 yrs."

xxxiv. Anima 1991, 23: "Six ranches surrounding Drakes Estero support an approximate total of 1,185 head of cattle."

xxxv. DBOC 2010v, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding public health.

"CDPH, Drinking Water Branch, permits and regulates the DBOC water system. DBOC provides well water samples to the CDPH state lab on a weekly basis year-round. DBOC also provides samples for physical, heavy metal and all other sampling to remain in compliance with public water systems requirements."

xxxvi. Goodman 2012, Letter from Corey Goodman to Acting Inspector General and Science Integrity Officer, Department of the Interior and Science Integrity Officer, National Park Service on April 24, regarding Allegations of false representations of data, concealment of data, and deception involving unnamed NPS and VHB employees who wrote, revised, and reviewed the NPS DEIS on Drakes Estero.

Boat-to-microphone distance measurements were identified in powerpoint slides submitted as exhibits to the aforementioned letter.

xxxvii. NPS 2011m, "Public Use Counting and Reporting Instructions, Point Reyes National Seashore." Available at <http://www.nature.nps.gov/stats/CountingInstructions/POREC11994.pdf>. Accessed April 25, 2011.

Data for the Point Reyes National Seashore public use reports is calculated using the Public Use Counting and Reporting Instructions located at <http://www.nature.nps.gov/stats/CountingInstructions/POREC11994.pdf>.

xxxviii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, 2010, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

"DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin."

xxxix. DBOC 2010r, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding interpretive services.

"Lastly, more forward-planning visitors call in advance to schedule a farm tour for their groups. We host a variety of groups for tours at the farm including, but not limited to, schools (from pre-school through graduate level), clubs, families, associations and non-profits."

xl. Cummings 2011, Letter from Ginny Lunny Cummings to Point Reyes National Seashore on December 7, 2011 regarding public comments on the National Park Service Draft Environmental Impact Statement Special Use Permit.

"Many [visitors] tell us they come to PRNS only to visit the oyster farm, not to hike, kayak, bird watch, visit beaches or the lighthouse or to whale watch. Rather, these visitors enjoy picnicking with family and friends at the oyster farm. Picnicking is an historical and important part of our farm visiting public's visitor experience and recreation."

xli. DBOC 2010r, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding interpretive services.

“Our comprehensive tours of Drakes Bay Oyster Company include the historical, cultural and ecological aspects of oyster farming in Drakes Estero. We also regularly include the broader subjects of sustainable agriculture, organic production and the history of other generational Seashore food producers within PRNS, including the dairy and beef ranches.”

xlii. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

“DBOC plays an essential role in educating the public on the history of oyster farming in PRNS, oysters’ values as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic sustainable farming.”

xliii. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

“It [DBOC] provides almost daily tours, at no cost, for the public and students from elementary through graduate school.”

xliv. DBOC 2010r, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding interpretive services.

“Some visitors enjoy simply reading and looking at our displays, viewing employees engaged in their daily work and regularly photographing images of the working farm”

xlv. SHPO 2011, Letter from State Historic Preservation Officer, Office of Historic Preservation, Department of Parks and Recreation, to Point Reyes National Seashore on August 4, regarding request for concurrence, Determination of Eligibility of Johnson’s Oyster Company (aka Drake’s Bay Oyster Company), Point Reyes National Seashore.

“Through this evaluation, NPS concludes that while Johnson’s Oyster Company appears to be significant under the NRHP Criterion A, it lacks historic integrity. Therefore, the property is not eligible for listing on the NRHP. After reviewing this determination of eligibility, I concur that the property is not eligible for listing on the NRHP.”

xlvi. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

“DBOC is the only farm of any kind within PRNS permitted to provide visitor and interpretive services to the visiting public. Without DBOC, Seashore visitors would completely lose any opportunity for services and interpretation within the Pastoral Zone or PRNS.”

xlvii. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

“As part of its visitor services, DBOC also provides bathrooms, directions, information about PRNS, and PRNS publications to the visiting public.”

xlviii. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company's comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

"In addition, DBOC is accessible to disabled visitors in the PRNS."

xlix. Cummings 2011, Letter from Ginny Lunny Cummings to Point Reyes National Seashore on December 7, 2011 regarding public comments on the National Park Service Draft Environmental Impact Statement Special Use Permit.

"DBOC has CPR and First Air trained staff and supplies, in the event of a visitor emergency. Additionally, as cell phones do not work anywhere near DBOC, DBOC offers its land line phone to visitors in need upon request. DBOC provides safe and sanitary public restrooms."

I. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company's comments on National Park Service Draft Environmental Impact Statement for Special Use Permit. Attachment: Comments on Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement Point Reyes National Seashore, prepared by ENVIRON International Corporation.

"All 22 workers at DBOC, who would lose their jobs if DBOC operates were cease, are of Hispanic or Latino ethnicity, and most also fall into the category of low-income."

ii. PCSGA 2011, Letter from the Pacific Coast Shellfish Growers Association to Point Reyes National Seashore on December 12, 2011 regarding Pacific Coast Shellfish Growers Association's comments on National Park Service Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit.

"Oyster growers around the country are struggling to keep up with demand for their product; such demand would increase if Drakes Bay Oyster Company is not permitted to continue its operations."

lii DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service's April 2012 questions.

"DBOC requests that all financial information remain confidential."

liii. DBOC 2010i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding business plan. Attachment 6a "DBO 2005-2010 Income and Expenses." Specific data is not provided here, at the request of DBOC.

liv. DBOC 2012b. Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on June 5, 2012 regarding DBOC responses to National Park Service's April 2012 questions.

"Approximately 25% of DBOC product is sold in jars and 75% is sold live in the shell."

lv. DBOC 2012b. Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on June 5, 2012 regarding DBOC responses to National Park Service's April 2012 questions.

"Approximately 40% of DBOC income is from onsite retail sales, 40% is sold directly to local market and restaurants – all delivered by DBOC directly, 18% is sold to Tomales Bay shellfish growers, and 2% is sold through a wholesale seafood distributor based in San Francisco."

lvi. DBOC 2010k, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding employee list. DBOC provided a list of current staff (as of the date of the letter).

Ivii. DBOC 2010k, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding housing.

“DBOC provides five homes with a total of 14 bedrooms for its employees; and in some cases, their families.”

Iviii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, 2010, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“[The DBOC] produces nearly 40% of California's grown oysters and, as the last operating cannery in the State, 100% of shucked and packed oysters.”

lix. CDFG 2011f, Letter the California Department of Fish and Game to Point Reyes National Seashore on December 22, 2011 regarding California Department of Fish and Game's comments on National Park Service Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit.

“DFG, page 223, Paragraph 2: The production rates for Drakes Estero are similar to production rates in Tomales Bay. Please make note that Tomales Bay production is a combined total of 10 leases held by 6 companies.”

Ix DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service's April 2012 questions.

“DBOC requests that all financial information remain confidential.”

Ixi DBOC 2010j, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding employee list. Provided a list of current staff (as of the date of the letter).

Ixii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, 2010, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.”

Ixiii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, 2010, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“DBOC contributes to science and research related to native oysters, estuarine biodiversity, and human health protection. It is the only oyster farm in the state with an on-site hatchery, lab, and biologists on staff. DBOC also presently recognized the importance of native oyster restoration projects, and donated \$10,000 worth of oyster shells to the largest such project in California.”

4

ENVIRONMENTAL CONSEQUENCES



4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This “Environmental Consequences” chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EIS. This chapter also includes a summary of laws and policies relevant to each impact topic, intensity definitions (negligible, minor, moderate, and major), methods used to analyze impacts, and methods used for determining cumulative impacts. As required by CEQ regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in table 2-6 in “Chapter 2: Alternatives.” The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in “Chapter 3: Affected Environment.”

FORMAT OF THE ANALYSIS

For each impact topic, laws and policies, methodology, and intensity definitions are presented first to provide context for how the resource topic was evaluated. This framework is followed by three additional sections specific to each alternative: Impact Analysis, Cumulative Impact Analysis, and Conclusion.

LAWS AND POLICIES

Relevant laws and policies are described for each resource.

METHODOLOGY

This section describes methods used for measuring and assessing impacts, intensity definitions specific to each resource, and a discussion of the references used for the analysis. This discussion acknowledges the uncertainty related to the strength of the underlying scientific data, discloses where site-specific information is not available, and summarizes the information used from similar or representative settings that is relevant to evaluating impacts on the resource.

Intensity Definitions

Intensity definitions are derived from relevant standards based on law, policy, regulations, NPS *Management Policies 2006*, scientific literature and research, or best professional judgment. Intensity definitions may vary by impact topic; therefore, they are provided separately for each impact topic analyzed in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major adverse impacts. The CEQ regulations advise (40 CFR 1500.2), and NPS *Management Policies 2006* require, that managers minimize and avoid adverse impacts on park resources. Standard NPS NEPA practice, as reflected in the Director's Order 12 Handbook and elsewhere, thus focuses on mainly such adverse effects. Beneficial effects are discussed and analyzed, wherever present, but generally only in a qualitative manner.

IMPACT ANALYSIS

This section describes the potential impacts of each of the alternatives. This section uses the best available scientific literature applicable to the region and setting to predict the expected impacts of each alternative, including the no-action alternative, using the existing condition (baseline) described in "Chapter 3: Affected Environment" as the starting point for the analysis. As noted by Bass, Herson and Bogdan, "[i]t is easy to confuse the baseline with the no-action alternative" (2001). They go on to explain "[t]he baseline is essentially a description of the affected environment at a fixed point in time, whereas the no-action alternative assumes that other things will happen to the affected environment even if the proposed action does not occur" (2001).

"Chapter 1: Purpose of and Need for Action" provides a summary of the types of references used in preparing the impact analysis. Generally, for this EIS, in cases where site-specific information was not available, references were taken from peer-reviewed scientific literature conducted in similar or representative settings where such references added clarity to the issues addressed. Secondary references were not used for the analysis, unless there was a compelling reason to do so.

CUMULATIVE IMPACT ANALYSIS

The approach to the second section of the analysis, "Cumulative Impact Analysis," is described more fully below, but generally describes the impacts which would result when the potential impacts of the alternatives are added to the impacts of other past, present, and recently foreseeable future actions.

CONCLUSION

The conclusion section provides a summary of the impacts and restates the overall impact "intensity definition." The definition is determined by using the description of the impacts from the "Impact Analysis" and applying an intensity level and duration to those impacts to provide context for the reader in understanding the extent and magnitude of a predicted adverse impact. This allows for comparison of the action alternatives to the no-action alternative, consistent with DOI NEPA regulations at 43 CFR 46.415(b)(1), which state:

“the analysis of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives.”

Language such as “would continue to occur” and “would remain altered” is included in the conclusion where appropriate to reinforce the fact that certain impacts being described are not new impacts, rather they are existing impacts that would persist into the future. This is especially true of the action alternatives, where impacts to resources would include both the continuation of existing DBOC operations and facilities in addition to new elements or actions proposed as part of the alternatives.

Additional site specific data may help to refine the conclusions in the EIS and reduce uncertainty regarding the level of impact on the human environment; however, all NEPA analysis is based on a prediction of potential future conditions and, as such, is always uncertain. In lieu of site-specific data, research methods generally accepted in the scientific community and best professional judgment have been used to draw conclusions regarding expected impacts to resources, as guided by CEQ and DOI requirements. The available data provide sufficient information to allow the decision maker to make a reasoned choice among alternatives.

This section also discusses consistency of the impacts of each alternative with relevant law and policy. Although the Secretary’s authority under section 124 is “notwithstanding any other law,” analysis of such consistency is still helpful.

ANALYSIS PERIOD

Consistent with the establishment of wilderness in Point Reyes National Seashore (PL 94-544 and 94-567) and the Wilderness Act (PL 88-577), the NPS will proceed with conversion of congressionally designated potential wilderness to congressionally designated wilderness upon expiration of authorizations (whether in 2012 or 2022) for a commercial shellfish operation in Drakes Estero. The impact analysis for the no-action alternative (alternative A) focuses on describing the expected impacts of the removal of the shellfish operation beginning in 2012 in a detailed manner. For the action alternatives (alternatives B, C, and D), the impact analysis focuses on describing the impacts associated with the issuance of a 10-year SUP for shellfish operations in Drakes Estero. A brief discussion of impacts upon expiration of the SUP in 2022 is included to give the reader a sense of the anticipated impacts beyond 2022. For some impact topics, this analysis is fairly straightforward, as the impacts (both adverse and beneficial) of the shellfish operation would cease immediately upon expiration of the SUP. For other impact topics, the analysis is less certain, as some impacts are expected to continue beyond 2022, but would likely diminish in intensity over time.

GEOGRAPHIC AREA EVALUATED FOR IMPACTS (AREA OF ANALYSIS)

The geographic area (or area of analysis) for the EIS includes DBOC onshore and offshore facilities and operations in and adjacent to Drakes Estero (see figures 1-3 and 1-4). The area of analysis is extended for visitor experience and recreation, socioeconomic resources, and NPS operations. The scale used for NPS

operations and visitor experience and recreation is the Seashore boundary. The area of analysis for socioeconomic resources is discussed further under that impact topic in this chapter.

TYPE OF IMPACT

The following terms are used for all impact topics (the terms “impact” and “effect” are used interchangeably throughout this document).

Beneficial:	A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
Adverse:	A change that moves the resource away from a desired condition or detracts from its appearance or condition.
Direct:	An impact that is caused by an action and occurs at the same time and place.
Indirect:	An impact that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable.

DURATION OF IMPACT

The duration of an impact defines how long the impact may last following implementation of an action. Wherever possible, the analysis quantifies the actual length of the expected impact. Impacts are defined as either short-term or long-term and are not generally both. The following terms are used for all impact topics to allow for easy summarization.

Short-term:	Impacts that last a relatively brief time following an action and/or are temporary in nature. Short-term impacts typically are less than 1 year in duration.
Long-term:	Impacts that last a relatively long time following an action and/or may be permanent. Long-term impacts typically are 1 year or longer in duration.

ASSUMPTIONS

A number of guiding assumptions were made to provide context for the impact analysis. As explained in chapter 1, a main resource used in development of this EIS was the NAS report, *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* (NAS 2009). The report provides an intensive review of pertinent scientific literature on this subject. As such, there is much overlap between the literature cited in that document and the references used to support this EIS. Pertinent to the analysis in this chapter are a few key considerations:

- The conclusions in the NAS report are based on 2008-2009 levels of DBOC production and operational practices. Production levels for 2008-2009, representing the current levels of production referenced by the NAS report, were approximately 450,000 lbs of shellfish, with Manila clams permitted only in the 1-acre Lease M-438-02 (Area 2). The actual footprint of the racks and bags on the bottom of Drakes Estero in 2008 was estimated to be less than 30 acres.

- The 2009 NAS report does not provide a definition or detection threshold for what a “major” adverse ecological effect would be in this context, nor does it indicate that the NAS use of an impact qualifier (e.g., “major”) is consistent with NEPA standards.
- It should also be noted that archeological and historical sources that pertain directly to the presence or absence of oysters in Drakes Estero prior to the establishment of an oyster operation in the 1930s were not considered in the NAS (2009) study.

In addition, the following assumptions are based on the descriptions of the alternatives provided in chapter 2.

ALTERNATIVE A

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. Actions associated with this alternative that have the potential to impact resources include:

- DBOC would be responsible for the removal of certain buildings and structures and all personal property (including any improvements made to the area since 1972).
- DBOC would be responsible for removal of commercial shellfish operations infrastructure in the 142 acres of established growing areas in Drakes Estero. This includes:
 - All 95 racks would be removed, including approximately 4,700 posts (2-inch by 6-inch boards) and more than 179,000 linear feet (approximately 5 miles) of pressure-treated lumber would be removed (this is anticipated to take 2 to 3 months outside the harbor seal pupping season, March 1 to June 30) and disposed of as appropriate.
 - All bags would be removed from Drakes Estero, including up to 88 acres of bottom bags. This is estimated to take approximately 2 to 4 weeks.
 - Standard BMPs to minimize associated impacts to the environment such as use of a silt curtain would be implemented.
 - Divers would also remove by hand any large debris that had fallen beneath the racks such as strings or large chunks of shell.
 - The timing of the rack removal would occur outside of the harbor seal closure period (March 1-June 30).
- DBOC operations, including motorboat use in Drakes Estero and the operation of pneumatic hammers/drills and other equipment associated with the onshore operations would cease.
- NPS would coordinate and conduct baseline surveys and monitoring of resources to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, Manila clams, etc.) and eelgrass.

ALTERNATIVE B

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in Drakes Estero. Actions associated with this alternative that have the potential to impact resources include:

- Onshore facilities and infrastructure, including previously unpermitted infrastructure, would be authorized and would remain. This would be generally consistent with what is currently present on the site.
- The total acreage of the SUP area, both onshore and offshore, would be approximately 1,082 acres.
 - Offshore: 1,078 acres (Area 1: 1,077 acres, Area 2: 1 acre)
 - Onshore 4.3 acres
- With the exception of slight reductions to Bed 17 (which currently extends into the seal protection areas), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.
- DBOC would cultivate approximately 138 acres of Drakes Estero using a combination of hanging and bottom culture (4 acres of Bed 17 would be removed).
- DBOC would continue to conduct hanging culture using 95 wooden racks for cultivation, which total approximately 5 miles when laid end-to-end (also expressed as 7 acres), in Drakes Estero.
 - In 2013, DBOC would repair 50 racks. The analysis assumes that between 50 percent and 75 percent of the rack material associated with those racks would need to be replaced; therefore, between 65,000 and 97,000 linear feet of lumber, not including between 1,700 and 2,500 posts, would be installed in Drakes Estero.
 - In 2014, DBOC would repair 25 racks. The analysis assumes that between 25 percent and 50 percent of the rack material associated with those racks would need to be replaced; therefore, between 14,000 and 29,000 linear feet of lumber, not including between 380 and 750 posts, would be installed in Drakes Estero.
 - Following this repair effort, maintenance of the racks is assumed to add between 1,000 and 2,000 linear feet of lumber to Drakes Estero annually. Vertical posts would be replaced as necessary.
 - Any materials removed from the racks would be disposed of as appropriate.
 - During rack repair, some increase in boat traffic may be required to supplement regular operations.
 - DBOC would use appropriate standard BMPs during removal of dilapidated materials and installation of new rack material, including use of coated wood (also expected to be a permit condition from the USACE) to reduce impacts on the environment.
- DBOC would continue to conduct bag culture in up to 84 acres of Drakes Estero (in the past 2 years, for example, approximately 22 acres of bags were planted annually).
- Dredging using appropriate standard BMPs would take place at the outset of the permit term in an area approximately 30 feet wide by 60 feet long and to a depth of approximately 3 feet. DBOC estimates that the total volume of dredged material would be 100 cubic yards (DBOC 2011dⁱ); although straightforward calculations indicate that it would be 200 cubic yards.
- DBOC would be required to pay the U. S. fair market value for the use of federal property, which includes onshore and offshore areas in the permit boundaries, as mandated by section 124.
- Pacific oysters and Manila clams could be cultivated in documented shellfish growing areas in Area 1. Purple-hinged rock scallops could only be grown in the existing 1-acre plot, Area 2.

- Shellfish production would not exceed 600,000 pounds annually (using the rolling 3-year average, inclusive of all harvested species¹).
- DBOC would operate motorized boats in the established SUP area in compliance with a NPS-approved vessel transit plan.
 - The total area of boat use estimated using available data is approximately 740 acres.
 - DBOC currently operates three motorboats in Drakes Estero: one is 16 feet long with a 20-horsepower 4-stroke engine, while the other is 20 feet long with a 40-horsepower 4-stroke engine. DBOC has not provided the NPS with information related to size or engine horsepower for the third boat, which has recently been reintroduced into operation (DBOC 2012bⁱⁱ).
 - In combination, DBOC boats operate approximately 8 hours per day, 6 days per week, making approximately 12 round trips per day, although levels of boat operation vary with conditions such as weather and demand (DBOC [Lunny], pers. comm., 2011h, 2012bⁱⁱⁱ).
 - NPS and CDPH have reviewed sampling protocols, intent, and requirements. The current SUP includes language for access to the main channel to sample the sentinel PSP station. Access to any required monitoring station outside the permit area shall be made at flat wake speed within 1 hour of predicted high tide for the area. Flat wake speed means the minimum required speed to leave a flat wave disturbance close astern a moving vessel yet maintain steerage, but in no case in excess of 5 statute miles per hour (36 CFR 1.4).
- DBOC operations would be subject to the harbor seal protection protocol as established in the 2008 SUP:
 - Boat travel and general operations, including placement of bags, moorings, and installation of floating racks, is prohibited in the established harbor seal protection areas.
 - Closure of the lateral channel in its entirety during the harbor seal pupping season (March 1 to June 30).
 - Maintenance of a 100-yard buffer from any hauled-out harbor seal.
- DBOC would replace the existing dock, work platform, and associated structures subject to NPS final review and approval due to damage from the March 2011 storm event, using appropriate standard BMPs such as silt curtains to reduce impacts on the environment.
 - New wooden floating dock (12 feet by 32 feet)
 - New concrete work platform (including sediment basin approximately 55 feet by 24 feet)

¹ The SUP would define the production limit using the average annual harvest over a rolling 3-year period, which would include the current year and the two previous years. For example, production of 600,000, 700,000 and 500,000 pounds over years 1 through 3 would be in compliance with this requirement with an average harvest of 600,000 pounds; however, harvest of 600,000, 700,000 and 600,000 pounds each year for a 3-year average of 633,333 pounds would not. The use of an average is meant to allow DBOC to reasonably account for natural variability in growing conditions and to adjust annual production as necessary. The number of individuals that could be produced under this alternative would depend upon the proportion of species harvested in a given year. The Final EIS uses the conversion for Pacific oyster of 100 oysters per gallon and 8.5 pounds per gallon. Assuming 100 percent oyster harvest, a limit of 600,000 pounds would equate to approximately 7,058,854 individuals. If some other species (e.g., Manila clams) were harvested, the oyster harvest would need to be lowered accordingly to maintain a rolling 3-year average of 600,000 pounds of shellfish produced annually. All references to “annual production” in the action alternatives follow this rolling 3-year average format.

- New wooden ramps to connect the dock and work platform
- New conveyor
- New washing system
- Staff housing would be provided (14 bedrooms)
 - 2 permanent houses
 - 3 mobile homes
- When the new SUP expires, DBOC would be required to remove certain buildings and structures and all of its personal property and to undertake steps to restore the area to good order and condition.
- NPS would coordinate baseline surveys and monitoring of resources to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, Manila clams, etc.) and eelgrass.

ALTERNATIVE C

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in Drakes Estero. The actions associated with this alternative that have the potential to impact resources are the same as those described under alternative B, with the following exceptions:

- In contrast to alternative B, onshore infrastructure would be slightly reduced by removing some unpermitted and nonessential facilities.
- The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 901 acres. Those acres not included in the permit area under this alternative are not currently available for production due to state water quality harvest prohibitions.
 - Offshore: 897 acres (Area 1: 896 acres, Area 2: 1 acre)
 - Onshore 4.3 acres
- Shellfish production would not exceed 500,000 pounds annually (using the rolling 3-year average, inclusive of all harvested species).
- Pacific oysters could be grown on documented shellfish growing areas in the main offshore permit area, Area 1. Purple-hinged rock scallops could only be cultivated in the existing 1-acre plot, Area 2.
- All cultivated Manila clams would be removed.
- DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and loss of *Didemnum* from oysters. This includes modification of current harvest and distribution practices to ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero.
- NPS would coordinate baseline surveys and monitoring of resources to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, etc.) and eelgrass.
- NPS would evaluate future requests for operational and infrastructure changes from DBOC taking into consideration consistency of the proposed changes with 2008 conditions and levels of production.

ALTERNATIVE D

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in Drakes Estero. The actions associated with this alternative that have the potential to impact resources are the same as those described under alternative B, with the following exceptions:

- Two development proposals submitted by DBOC are evaluated at the conceptual level in this EIS. Additional planning, site design, environmental compliance, and approval would be required prior to proceeding with construction of proposed new facilities. Additional NEPA compliance would be required.
 - Option 1: New facilities include a 2-story, 7,600-square-foot processing and interpretive center; 6,400-foot indoor setting tank; outdoor aquarium; garage; employee parking; staff housing remains as is.
 - Option 2: New facilities include 2,625-square-foot multipurpose building; no staff housing identified.
 - New 1,050-foot water intake pipe installed into Drakes Estero to serve new oyster processing facilities.
 - During additional design phases of the new onshore development under alternative D, NPS would work with DBOC to ensure that onshore sound-generating equipment would be housed in new buildings constructed or otherwise enclosed to the extent practicable.
- The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 1,087 acres, which incorporates the boundary adjustment requested by DBOC.
 - Offshore: 1,082 acres
 - Onshore: 4.3 acres
- Shellfish production would not exceed 850,000 pounds annually (using the rolling 3-year average, inclusive of all harvested species).
- Pacific oysters, Manila clams, Olympia oysters, and purple-hinged rock scallops could be cultivated in documented shellfish growing areas in the offshore permit area. The 1-acre plot (Area 2) would not be maintained as a distinct shellfish growing area.
- Due to the increased levels of production:
 - Boat traffic/number of boat trips may increase.
 - Acreage of bags placed in Drakes Estero would be at least approximately 22 acres per year, not exceeding 84 acres in cultivation at any given time.
- Due to the presence of new facilities and increased production at DBOC, an increase in sales and potentially in visitation may occur.
- NPS would coordinate baseline surveys and monitoring of resources to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, Manila clams, etc.) and eelgrass.

When the new SUP expires, DBOC would be responsible for the removal of all infrastructure developed under this alternative, as well as all personal property. DBOC would be required to restore the area to good order and condition.

CUMULATIVE IMPACT ANALYSIS METHODOLOGY

The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as impacts which result when the impact of the proposed action is added to the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7). These impacts can be beneficial or adverse. Cumulative impacts are considered for all alternatives, including alternative A.

The analysis of cumulative impacts was accomplished using four steps:

Step 1—Identify Resources Affected: Fully identify resources affected by any of the alternatives.

Step 2—Set Boundaries: Identify an appropriate spatial and temporal boundary for each resource.

Step 3—Identify Cumulative Action Scenario: Determine which past, present, and reasonably foreseeable future actions to include with each resource.

Step 4—Cumulative Impact Analysis: Summarize the impacts of these other actions (x) plus the impacts of the proposed action (y) to arrive at the total cumulative impact (z).

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, present, or reasonably foreseeable future projects and plans at the Seashore. The following projects were determined to be potential contributors to cumulative impacts on the affected resources in conjunction with the potential impacts of the alternatives presented in this document. The past actions considered in this EIS are bounded by approximately five years.

Restoration of the Developed Onshore Area Following SUP Expiration. Following expiration of either the existing NPS authorizations in 2012 or a new SUP in 2022, the NPS would undertake actions to maintain and restore natural conditions at the developed onshore area. Although temporary structures and personal property associated with the current commercial shellfish operations would be removed as part of all alternatives, permanent structures (such as the main house and the processing plant) would remain, as they are already owned by NPS. The Seashore would evaluate restoration of natural shoreline conditions, including removal of remaining structures, removal of fill from wetland areas, and restoration of tidal conditions to the pond northwest of the developed area through a separate planning process. The Seashore would relocate public access and facilities to a location more appropriate with anticipated sea-level rise, as necessary. Public access to Drakes Estero would be maintained. The following resources could be impacted by the proposed restoration activities: wetlands and other waters of the U.S., wildlife and wildlife habitat (fish and birds), special-status species, coastal flood zones, water quality, soundscapes, and NPS operations.

Kayaking. Recreational use of nonmotorized watercraft (mostly kayaks) is a popular use of Drakes Estero. Thirteen commercial operators are currently authorized by the Seashore to provide kayak tours in Point Reyes National Seashore, including Drakes Estero between July 1 and February 28 each year (outside of harbor seal pupping season). Of those authorized, a small number currently offer tours in Drakes Estero (an estimated two or three of the companies). In addition, visitors to the Seashore have access to Drakes Estero for kayaking as individuals. Research suggests that kayaking may affect harbor seal behavior (Becker, Press, and Allen 2011; Suryan and Harvey 1999; Calambokidis et al. 1991), cause bird flushing (Kelly et al. 1996), and could also impact harbor seal migratory patterns during pupping season (Suryan and Harvey 1999). The NPS would evaluate recreational use levels in Drakes Estero and may limit use by permit. Continued (and potentially increased) use of kayaks and other nonmotorized watercraft (such as canoes or paddle boards) in Drakes Estero has the potential to impact wildlife and wildlife habitat (harbor seals and birds), soundscapes, visitor experience and recreation, and socioeconomic resources.

Fire Management Plan. The current fire management plan for the Seashore was published in 2006 (Fire Management Plan: Operational Strategy). The purpose of the fire management plan is to provide a framework for all fire management activities in the Seashore and the North District of Golden Gate National Recreation Area (NPS 2006b). Such activities include prevention and suppression of unplanned ignitions, prescribed fire, fire education and information, monitoring, fire and fuels research, and mechanical fuels treatments. The project area is in the Drakes Estero fire management unit, which is one of three fire management units (out of 11 total in the Seashore) that were established primarily for resource management reasons. Fire management planning in the Seashore has the potential to impact the following resources: water quality and NPS operations (NPS 2006b).

Move Vault Toilet out of Flood Hazard Area. The vault toilet may be moved away from the coastal flood hazard zone to a location more appropriate to protect water quality and shoreline resources. A specific location for the vault toilet would be determined through a separate planning process. Moving the vault toilet away from the shoreline could impact the following resources: coastal flood zones, water quality, and NPS operations.

Ranching Operations. Six cattle ranches are located in the Drakes Estero watershed. According to Baltan (2006) and Zubkousky (2010) the primary source of nonpoint-source pollution in Drakes Estero is from cattle waste from ranches in the Drakes Estero watershed. Specifically, fecal coliform levels in most of Drakes Estero have been shown to intermittently rise after rain events associated with runoff from pastures in the watershed (Baltan 2006; Zubkousky 2010). In addition, other pollution sources include residential septic facilities associated with ranching operations. In 2006, the NPS upgraded a failed septic system at Home Ranch following flooding events that winter. The leachfield was established in an upland area outside of the area subject to flooding. Ranchers in cooperation with the NPS have installed riparian fencing and other BMPs to reduce cattle access to stream habitat. Shellfish harvesting closures triggered by rainfall events have been required in Drakes Estero for more than a decade. Continued ranching in the vicinity of the project area has the potential to impact the following resources: water quality and socioeconomic resources.

Human-caused Noise Sources (Non-DBOC). Ongoing sources of noise in Drakes Estero (other than those related to DBOC, which are evaluated as an impact topic) such as overflights and the use of cars along Sir Francis Drake Boulevard, have the potential to impact resources in and around the project area. For instance, according to recent data collection, overflights account for 13 percent (in the summer) to 17.6 percent (in the winter) of audible sounds at the PORE004 site located on the bluff of Drakes Estero;

however, the change in median sound levels (L_{50}) due to all aircraft at the PORE004 site is estimated to be small: 1.4 dBA in summer and 1.7 dBA in winter (Volpe 2011). These actions could impact wildlife and wildlife habitat (seals and birds), soundscapes, and visitor experience and recreation.

Planning and Management Activities. Past, present, and future planning and management activities at the Seashore include the following projects/activities:

- New GMP
- Adapting Drakes Beach Visitor Access Facilities to Accommodate Anticipated Coastal Change to Improve Natural Coastal Process
- Abbotts Lagoon Coastal Dune Restoration Project
- Regular trail maintenance
- Approval of research permits

Some of these projects may involve activities in the Phillip Burton Wilderness. Any action proposed to take place in congressionally designated wilderness, such as research or park management, is subject to a minimum requirement analysis as described in the Minimum Requirements Decision Guide (developed by the interagency Arthur Carhart National Wilderness Training Center and available on wilderness.net) and NPS *Management Policies 2006* (NPS 2006d, section 6.3.5). This concept is applied as a two-step process that determines (1) whether or not the proposed action is appropriate or necessary for administration of the area as wilderness and does not cause significant impact on wilderness resources and character, in accordance with the Wilderness Act, and (2) the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized (NPS 2006d).

These actions could impact eelgrass, wildlife and wildlife habitat (harbor seals and birds), special-status species, soundscapes, wilderness, visitor experience and recreation, and NPS operations.

Coastal Watershed Restoration: Geomorphic Restoration Project. Completed in 2009, the purpose of the *Coastal Watershed Restoration Program: Geomorphic Restoration Project* was to restore natural conditions and increase estuarine habitat at Point Reyes (NPS 2004a). The project was designed to reduce the maintenance demands at Point Reyes, to eliminate the risk of catastrophic failure of culverts and dams, and to increase sustainability, both operationally and ecologically, in the small coastal watersheds. Restoration efforts included the removal of a 25-foot-high, 100-foot-wide road prism from the Muddy Hollow Trail crossing of Glenbrook Creek, a nonconforming structure in the Phillip Burton Wilderness, and expansion of tidal habitat to portions of Estero de Limantour through the removal of Muddy Hollow Dam, Limantour Beach Pond Dam, and Glenbrook Dam. The remains of Glenbrook Dam, a breached dam in the wilderness portion of Estero de Limantour were removed in 2009. Minimum Requirements Analysis and Minimum Tool Determination were completed for each of the projects in the Phillip Burton Wilderness. Each of the sites included in the project had been identified as impeding or blocking access to watersheds that support, or have the potential to support, federally threatened coastal California steelhead and Coho salmon (NPS 2004a). Resources impacted by the *Coastal Watershed Restoration Geomorphic Restoration Project* include wetlands and other waters of the U.S., eelgrass, wildlife and wildlife habitat (benthic fauna, fish, and birds), special-status species, water quality, wilderness, and NPS operations (NPS 2004a).

Coastal Watershed Restoration: Drakes Estero Road Crossings Improvement Project. The *Drakes Estero Road Crossings Improvement Project*, completed in 2008, was designed to replace or remove culverts and fish passage problems at six sites in the Drakes Estero watershed. The culverts were designed to facilitate restoration of natural hydrologic and geomorphic processes and fish passage in the watersheds, which are known to support threatened and endangered aquatic species, including the federally listed central California steelhead and potentially the endangered Coho salmon. The project also was undertaken to make road maintenance operations more sustainable (NPS 2004b). Resources impacted by the *Drakes Estero Road Crossing Improvement Project* include wetlands and other waters of the U.S., eelgrass, wildlife and wildlife habitat (benthic fauna, fish, and birds), special-status species, water quality, and NPS operations (NPS 2004b).

California Aquaculture Programmatic Environmental Impact Report (PEIR). A California Aquaculture Programmatic Environmental Impact Report (PEIR) is being developed for CDFG, which would alter management of CDFG's aquaculture leasing program along the coast in state-owned tidelands (CA.gov 2010). CDFG currently regulates the stocking of aquatic organisms, brood stock acquisition, disease control, and the importation of aquatic organisms into the state under Division 12 of the Fish and Game Code (as described in chapter 1). The management framework proposed by CDFG would include:

- new requirements for providing baseline information with applications for proposed new leasing sites
- new siting criteria to be used by CDFG when reviewing applications for new leases
- new lease application requirements and operational requirements designed to avoid significant environmental effects
- potential restrictions on the number of new leases for finfish cultivation that would be allowed in the next 10 years

Implementation of actions associated with the PEIR has the potential to impact socioeconomic resources.

Expansion of Mariculture in Humboldt Bay, California. In July 2011, the Board of Supervisors of Humboldt County voted to approve a \$200,000 grant to allow expansion of mariculture on granted tidelands in Humboldt Bay. The grant has been awarded under the Headwaters Fund and will be provided to the Humboldt Bay Harbor, Recreation and Conservation District. The Headwaters Fund was established in 2003 to provide support for economic and community development in Humboldt County and, in part, provides grants for projects that would benefit base industries in the county (County of Humboldt 2011). Such grants are typically accepted annually and each grant averages between \$200,000 and \$300,000. The recently approved funding would be dedicated to conducting pre-permitting studies with the intent of expanding potential shellfish growing areas in Humboldt Bay (Greenson 2011). The intent is that such studies would expand the acres available for mariculture operations, thereby expanding the mariculture industry in Humboldt Bay (Greenson 2011). Expansion of shellfish operations in Humboldt Bay has the potential to impact socioeconomic resources.

Change in NOAA Aquaculture Policy. Domestic aquaculture currently accounts for approximately 5 percent of the seafood consumed in this country, approximately 65 percent of which is shellfish. Additionally, 84 percent of the seafood imported to the U.S. is from foreign aquaculture. In an effort to reduce these imports and support the U.S. economy, national sustainable marine aquaculture policies have been established by the U.S. Department of Commerce and NOAA (NOAA 2011a). These policies have

been specifically designed to support a national approach to sustainable aquaculture that will meet the increased demand for healthy seafood in the U.S.; support coastal communities, including commercial and recreational fisheries; and restore vital species and habitat. Focused efforts will include encouraging and fostering sustainable aquaculture that increases the value of domestic aquaculture production and creates American business, jobs, and trade opportunities (NOAA 2011a). This change in NOAA aquaculture policy has the potential to impact socioeconomic resources.

Economic Trends. The current economic recession is having a dampening effect on the national and local economy; however, despite the poor economic conditions, visitation to the Seashore has remained generally steady between 2005 and 2011, ranging from 1.99 million visitors in 2005 to 2.25 million in 2008 (NPS 2011a). Due to the recent economic recession, unemployment rates in both the state and Marin County have increased since 2008 (U.S. Department of Labor 2011). As the country comes out of this recession, it is anticipated that increasing population and economic opportunities would provide beneficial impacts to the economy of Marin County. Past, present, and reasonably foreseeable economic trends have the potential to impact socioeconomic resources.

CDFG Marine Life Protection Act Initiative. In May 2010, the MLPA initiative took effect along the north-central coast of California (CDFG 2010c). A total of 21 MPAs were established in coastal areas between Alder Creek, near Point Arena in Mendocino County, and Pigeon Point in San Mateo County. Pursuant to the MLPA, California's marine protection areas must periodically be reexamined and redesigned "to increase their coherence and effectiveness at protecting the state's marine life, habitat, and ecosystems" (CDFG 2010c). A number of MPAs were established along the coast of the Seashore. Two of these areas are located in the project area, including the Drakes Estero State Marine Conservation Area (SMCA) and Estero de Limantour State Marine Reserve (SMR). The Drakes Estero MPA prohibits the take of any living marine resource except for recreational take of clams and the commercial aquaculture operations under valid State Water Bottom Lease and permit (CDFG 2010c). The Estero de Limantour SMR prohibits take of any living marine resource (CDFG 2010c). The Fish and Game Code definition of take is "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." MPAs associated with the MLPA have the potential to impact the following resources: eelgrass, wildlife and wildlife habitat (benthic fauna, fish, harbor seals, and birds), special-status species, and wilderness (CDFG 2010c).

Table 4-1 provides a summary of the cumulative analysis study area for each impact topic, as well as the past, present, and reasonably foreseeable future actions that could affect each impact topic.

TABLE 4-1. CUMULATIVE IMPACTS ANALYSIS ACTIONS

Study Area	Past Actions	Present Actions	Reasonably Foreseeable Future Actions
Wetlands and Other Waters of the U.S.			
Project area	<ul style="list-style-type: none"> ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 		<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration
Eelgrass			
Drakes Estero	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ CDFG MLPA initiative
Wildlife and Wildlife Habitat: Benthic Fauna			
Drakes Estero	<ul style="list-style-type: none"> ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ CDFG MLPA initiative
Wildlife and Wildlife Habitat: Fish			
Drakes Estero	<ul style="list-style-type: none"> ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ CDFG MLPA initiative

TABLE 4-1. CUMULATIVE IMPACTS ANALYSIS (CONTINUED)

Study Area	Past Actions	Present Actions	Reasonably Foreseeable Future Actions
Wildlife and Wildlife Habitat: Harbor Seals			
Drakes Estero	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities ▪ CDFG MLPA initiative
Wildlife and Wildlife Habitat: Birds			
Project area	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities ▪ CDFG MLPA initiative
Special-status Species			
Drakes Estero	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Planning and management activities ▪ CDFG MLPA initiative
Coastal Flood Zones			
Project area			<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Moving the vault toilet out of the flood hazard area

TABLE 4-1. CUMULATIVE IMPACTS ANALYSIS (CONTINUED)

Study Area	Past Actions	Present Actions	Reasonably Foreseeable Future Actions
Water Quality			
Drakes Estero	<ul style="list-style-type: none"> ▪ Fire management plan ▪ Ranching operations ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ Fire management plan ▪ Ranching operations 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Fire management plan ▪ Moving the vault toilet out of the flood hazard area ▪ Ranching operations
Soundscapes			
Project area	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities
Wilderness			
Drakes Estero	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ Coastal Watershed Restoration: Geomorphic Restoration Project 	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ CDFG MLPA initiative 	<ul style="list-style-type: none"> ▪ Planning and management activities ▪ CDFG MLPA initiative
Visitor Experience and Recreation			
Project area	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Human-caused noise (other than DBOC) ▪ Planning and management activities

TABLE 4-1. CUMULATIVE IMPACTS ANALYSIS (CONTINUED)

Study Area	Past Actions	Present Actions	Reasonably Foreseeable Future Actions
Socioeconomic Resources			
Marin County or, for the purposes of evaluating shellfish production, the State of California	<ul style="list-style-type: none"> ▪ Kayaking ▪ Ranching operations ▪ Economic trends 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Ranching operations ▪ Economic trends 	<ul style="list-style-type: none"> ▪ Kayaking ▪ Ranching operations ▪ California Aquaculture PEIR ▪ Expansion of mariculture in Humboldt Bay ▪ Change in NOAA Aquaculture Policy ▪ Economic trends
NPS Operations			
Seashore	<ul style="list-style-type: none"> ▪ Fire management plan ▪ Planning and management activities ▪ Coastal Watershed Restoration: Geomorphic Restoration Project ▪ Coastal Watershed Restoration: Drakes Estero Road Crossing Improvement Project 	<ul style="list-style-type: none"> ▪ Fire management plan ▪ Planning and management activities 	<ul style="list-style-type: none"> ▪ Restoration of the developed onshore area following SUP expiration ▪ Fire management plan ▪ Moving the vault toilet out of the flood hazard area ▪ Planning and management activities

CUMULATIVE IMPACT CONTRIBUTION TERMINOLOGY

In defining the contribution (i.e., incremental effect contributed) of each alternative to cumulative impacts, the following terminology is used.

- Imperceptible:** The incremental effect contributed by the alternative to the cumulative impact is so small that it is impossible or extremely difficult to detect.
- Noticeable:** The incremental effect contributed by the alternative, while evident and observable, is still relatively small in proportion to the cumulative impact.
- Appreciable:** The incremental effect contributed by the alternative is evident and observable, and constitutes a large portion of the cumulative impact.

IMPACTS ON WETLANDS AND OTHER WATERS OF THE U.S.

LAWS AND POLICIES

DO-77-1 sets the policy framework for the evaluation of NPS projects and their impacts on wetlands (NPS 2002a). This Director's Order implements President Carter's Executive Order 11990 issued in 1977, requiring federal agencies "to avoid to the extent possible the long- and short-term impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands wherever there is a practicable alternative." The aspect of avoidance established in DO-77-1 is consistent with the federal mandate of "no net loss" of wetlands, which was first adopted in 1989 (NPS 2002a). The term "no net loss" refers to the aquatic resource functions provided by wetlands (such as habitat, nutrient cycling, and biodiversity), not just acreage. In addition, NPS *Management Policies 2006* establishes a long-term goal of "net gain" in wetland habitat based on restoration of wetlands that have been degraded or lost due to past human activities (NPS 2006d).

All proposed activities and structures extending into Drakes Estero from the line onshore reached by mean high tide designated as navigable waters of the U.S., must be authorized by USACE pursuant to section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). These would include all offshore structures (racks) and the dock located at the onshore facilities. Additionally, all activities and structures proposed in unfilled portions of the interior of diked areas below former mean high water (in this case, the pond behind the mobile homes) also must be authorized under section 10 of the same statute. The USACE issued authorization (now expired) to DBOC for the emergency repair of the dock in 2011 after damage from the March 20, 2011 storm.

Section 404 of the CWA (33 U.S.C. 1344) prohibits the discharge of dredge or fill material into waters of the U.S., including wetlands, except as permitted by the USACE. Waters of the U.S. generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands. In a letter to NPS dated November 16, 2010, USACE stated:

"The aquaculture activities are in our jurisdiction and a permit is required. Review of our files indicates that the Drakes Bay Oyster Company aquaculture operation does not have a current permit application or permit on file. The Corps advises that the Drakes Bay Oyster Company submit a permit application to ensure their activities comply with our regulations. Application for Corps authorization should be made to this office." (USACE 2010)

Rules for implementing section 404 of the CWA are found in 33 CFR 320-330. Under these rules, the USACE has established general permits for certain activities across the nation believed to cause minimal impacts to the aquatic environment. These general permits (called Nationwide Permits) are reviewed every 5 years for revocations or modifications of certain activities. The most recent changes to the Nationwide Permits (NWP) were released as a Final Notice on February 21, 2012 (33 CFR 330). One such NWP is *Commercial Shellfish Aquaculture Activities* (NWP # 48). The USACE's decision to issue this permit is based on actions believed to "result in minimal adverse environmental effects to the environmental criteria established under the CWA. The shellfish populations supported by the activities

authorized by this Nationwide Permit help support the objective of the CWA because they improve water quality through the conversion of nutrients into biomass (i.e. shellfish growth) and the removal of suspended materials through filter feeding.” (Federal Register/Vol. 77, No. 34, pages 10228-10229). This permit authorizes “the installation of buoys, floats, racks, trays, nets, lines, tubes, containers, and other structures into navigable waters of the U.S. This permit also authorizes discharges of dredged or fill material into waters of the U.S. necessary for shellfish seeding, rearing, cultivating, transplanting, and harvesting activities.” This permit does not restrict the number of structures related to shellfish operation equipment placed in waters or secondary impacts resulting from daily shellfish operations. However, if the proposed action would take place in or adjacent to eelgrass beds, regional USACE conditions require that the landowner notify the USACE in advance of beginning the work (in accordance with General Condition No. 31). This notification must include a compensatory mitigation plan, habitat assessment, and extent of proposed project impacts to eelgrass beds. NWP 48 does not allow: a) the cultivation of non-indigenous species unless that species has been previously cultivated in the waterbody; b) the cultivation of an aquatic nuisance species as defined in the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990; or c) attendant features (docks, boat ramps, etc.), or d) the deposition of shell waste back into waters of the U.S. The decision whether a project qualifies for a NWP 48 lies with the USACE. Mariculture operations that do not qualify for this NWP are required to secure an individual permit subject to the CWA section 404 permit process. DBOC has not submitted an application to the USACE at this time.

The California State Water Resources Control Board is the regulatory agency that oversees state water quality certification under section 401 of the CWA. The California State Water Resources Control Board is tasked with reviewing the entire NWP program implemented by the USACE to determine which NWPs may or may not meet state water quality certification. The California State Water Resources Control Board San Francisco Bay Regional Water Quality Control Board has denied without prejudice state water quality certification for mariculture projects that may qualify for NWP 48 (CSWRCB 2012). As a result, commercial shellfish applicants must submit a separate section 401 certification application to their regional water quality control board. For DBOC, a permit application would be submitted to the San Francisco Bay Regional Water Quality Control Board for its review.

The CCC oversees implementation of the CZMA. This agency reviews all USACE permit actions to ensure compliance with the CZMA. Upon review of the recent changes in the NWPs, the CCC issued a letter on April 11, 2012, to the USACE that explains the coordination process between the CCC and USACE when a NWP notification is submitted by an applicant. In that letter, CCC states that “A NWP will not be valid for any qualifying activity until the Commission either concurs with a consistency certification or waives the requirement” (CCC 2012c). If the CCC determines that consistency certification is required, an applicant would need to submit an application for a coastal development permit consistent with the California Coastal Act.

METHODOLOGY

This section is focused primarily on the physical impacts on intertidal wetlands and other waters of the U.S. and their functions from the actions that would potentially occur under each alternative. Wetlands and other waters of the U.S. discussed in this section include subtidal areas, intertidal mudflats, intertidal emergent wetlands, and a pond adjacent to the onshore facilities. Specific discussions for impacts on water quality,

subaquatic vegetation (eelgrass), and fauna (benthic organisms, mammals, amphibians, invertebrates, fish, and birds) that reside in wetlands and other waters of the U.S. are discussed in the appropriate impact topic sections. Information from primary literature sources (i.e., those that satisfy the criteria for “primary references” as described in Chapter 1: “References Used for Impact Analysis”) was used, particularly published research in areas with a similar setting as Drakes Estero. This was supplemented with the analysis and conclusions of the NAS review on wetlands (NAS 2009).

Typically, impacts on wetlands and other waters of the U.S. are measured in terms of land area (e.g., acres, square feet, etc.) for each action such as the filling or dredging of wetlands. In assessing impacts for this EIS, a determination of exact acreage cannot be quantified for alternatives B, C, and D because materials placed in wetlands and other waters of the U.S. (e.g., floating bags, anchors, bottom bags) would change day to day over the course of the 10 year permit period. Approximate quantifications are provided in the analysis below based on information provided by DBOC on the spatial extent of its operations. For the most part, the types of actions performed by DBOC in wetlands and other waters of the U.S. are not expected to vary greatly between alternatives B, C, and D. It can be assumed, however, that slight differences in the amount of materials placed in wetlands and other waters of the U.S. may occur between the alternatives based on production limits, but this difference is unknown.

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on wetlands and other waters of the U.S. would be slightly detectable and localized (affecting a small portion of the wetlands and other waters of the U.S. in the project area), and would not affect the overall structure, processes, or functions of the wetlands and other waters of the U.S.
Moderate:	Impacts on wetlands and other waters of the U.S. would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area.
Major:	Impacts on wetlands and other waters of the U.S. would be readily apparent and would severely alter or completely eliminate the structure, processes, or functions of the wetlands and other waters of the U.S. in the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including infrastructure associated with commercial shellfish operations in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

Under this alternative, removal of 5 linear miles (equivalent to 7 acres of offshore racks) and up to 88 acres of bag infrastructure associated with the 142 acres of the permitted culture beds would allow natural wetland processes (vegetation and benthic organisms) to restore and resume. Specifically, removal of

oyster culture bags from the 88 acres of permitted areas occupied by nonvegetated mudflats and sandbars in Drakes Estero would allow benthic organisms to recolonize the space previously occupied by the bags (Dumbauld, Ruesink, and Rumrill 2009; Ruesink et al. 2005). Erosive forces on sediments caused by tidal water flowing across and around bags (NAS 2010) would be eliminated, restoring natural hydrodynamics to the 88 acres of sandbars and mudflats used by DBOC. Removal of offshore infrastructure from Drakes Estero would promote the growth and spread of eelgrass in areas below the racks (see Eelgrass section). Dismantled racks would be loaded by boat and transported to the onshore facility for offsite disposal. Standard BMP practices would be employed during dismantling activities to reduce sediment disturbances and water turbidity levels.

Marine debris from damaged mariculture infrastructure has become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. Under this alternative, wetlands and other waters of the U.S. would be further enhanced by eliminating the potential for mariculture debris pollution.

Temporary local adverse impacts across 88 acres of E2US wetlands (estuarine, intertidal, unconsolidated shore, sand/mud) would occur while DBOC bags and trays are being removed. This would be a single event lasting approximately 2 to 3 months as workers exit boats and walk across the mudflats during low tide to retrieve the bags, trays, lines, and weights. Sediments in areas of foot traffic would become loosened and suspended into the water column during the next ebb tidal cycle. Disturbances to the Drakes Estero subtidal aquatic bottom would occur during removal of the approximately 4,700 posts (2-inch by 6-inch boards) that support the 7 acres of shellfish racks. Sediment may also be disturbed by boat propellers in shallow areas, which would result in increased turbidity and temporary decreases in primary productivity due to decreased sunlight penetration in the water column over the 2 to 3 month period (Newell 2004; Newell and Koch 2004).

Onshore operations would cease under alternative A, and DBOC equipment and personal property would be removed using standard sediment control BMPs. The main residence and processing plant would remain as NPS property.

Alternative A would eliminate the boats and barges associated with the commercial shellfish operation in Drakes Estero. This action would be expected to have beneficial impacts on wetlands and other waters of the U.S. in Drakes Estero due to the termination of propeller damage to E2US and E1/E2AB wetlands (estuarine, intertidal and subtidal, aquatic bed, rooted vascular) and the reduction in sediment disturbance to the intertidal mudflats and sandbars associated with propeller use in shallow waters. Beneficial impacts on wetlands and other waters of the U.S. would include a reduction in propeller-caused turbidity in the water column, which would result in increased sunlight penetration and therefore increased primary production.

Alternative A would remove the main dock extending into E2US wetlands and other waters of the U.S. This action would provide for the restoration of a small portion of the Drakes Estero beach wetlands (E2US2) by allowing sediment sorting and foraging/loafing areas for shorebirds.

The California Climate Change Center report (Heberger et al. 2009) and Cayan et al. (2009) suggest the potential of sea level rise due to climate change could reach a rate of 3 to 4.5 feet by 2100, which is equivalent to a rate of 5.9 inches over the next 10-years at the high end. Based on this prediction, portions of intertidal vegetated wetlands in Drakes Estero would convert to a subtidal zone of year-round

inundation adversely affecting normal hydrophytic plant life cycles and habitats. Marsh vegetation would attempt to migrate landward as new intertidal areas are formed. The extent of intertidal mud flats would become smaller in acreage in Drakes Estero while subtidal areas and habitat for eelgrass would increase in size. Actions posed under alternative A are not expected to contribute to the long-term, predicted impacts to wetlands from climate change and sea level rise.

As described above, alternative A would result in long-term beneficial impacts on wetlands and other waters of the U.S. because the removal of commercial shellfish infrastructure would allow natural processes to resume in areas where these structures displace natural wetlands. Impacts related to operations of motorboats would also cease. Alternative A would result in short-term minor adverse impacts because removal of shellfish infrastructure would cause localized increases in sedimentation that would last 2 to 3 months.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wetlands and other waters of the U.S. in the project area. These actions include restoration of the onshore developed area following SUP expiration in 2012, coastal watershed restoration projects in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and monitoring/managing invasive species.

Efforts associated with recent coastal watershed restoration projects in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) included the prevention of catastrophic failure of structures such as berms, dikes, and culverts through removal or stabilization and improvement efforts. These improvements would prevent future damage to downstream wetlands and other waters of the U.S.; therefore resulting in long-term beneficial impacts on wetlands and other waters of the U.S. in the project area.

The impact of these past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of the past, present, and reasonably foreseeable future actions, when combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on wetlands and other waters of the U.S. in the project area. Alternative A would contribute an appreciable beneficial increment to the cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on wetlands and other waters of the U.S., in the project area. Structures, processes, and functions of the wetlands and other waters of the U.S. would not be permanently affected as a result of actions from alternative A. However, climate change over the long term may result in sea level rise and the year-round inundation of current intertidal marsh. Vegetated wetlands in Drakes Estero occupy available habitat in the upper bays, and while tidal vegetation has the ability to shift with sea level rise, there is little room for vegetation to shift landward along much of the Drakes Estero shoreline due to the steep sideslopes of the surrounding terrain. The removal of personal property would increase the potential that approximately 3.8 acres of the project area

could be converted back to historical wetland habitat at the onshore facilities. The removal of approximately 7 acres of racks and up to 88 acres of bags from nonvegetated sandbars and mudflats in Drakes Estero would allow benthic organisms and eelgrass in Drakes Estero to recolonize the space previously occupied by the commercial shellfish operation infrastructure (see “Impacts on Eelgrass” and “Impacts on Wildlife and Wildlife Habitat: Benthic Fauna” sections). Additionally, erosive forces on sediments caused by tidal water flowing across and around bags would be eliminated, restoring natural hydrodynamics in up to 88 acres of sandbars and mudflats currently available for use by DBOC. The reduction of propeller-caused turbidity in the water column also would result in increased sunlight penetration and therefore increased primary production.

The removal of racks, including approximately 4,700 posts (2-inch by 6-inch boards), and the removal of bags from up to 88 acres of mud flats would result in short-term minor adverse impacts on wetlands and other waters of the U.S. because of temporary bottom disturbances. Standard BMPs would be used during the removal of racks to minimize sediment disturbances and water turbidity. The increase in turbidity would be highly localized and would occur over a two to three month period. Governmental permit authorization from the USACE would not likely be required. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.

With respect to wetlands and other waters of the U.S., alternative A would be consistent with relevant law and policy. The natural recovery of wetlands would be consistent with NPS *Management Policies 2006* and DO-77-1, which sets a goal of a “net gain” of wetlands (NPS 2006d, 2002a). USACE would be consulted to determine whether the removal of commercial shellfish infrastructure would require permitting.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative having the potential to impact wetlands and other waters of the U.S. include:

- Use and maintenance of shellfish racks, floating bags/trays, and bottom bags in Drakes Estero
- Continued motorized boat traffic
- Installation of a new dock, including dredging

Under alternative B, DBOC would have access to up to 84 acres of tidal mudflats and sandbars for bags and trays. DBOC would continue to cultivate shellfish, until 2022, with a production limit of 600,000 pounds per year (rates similar to current production) and with the existing onshore infrastructure. Shellfish operations would require permitting at the state and federal level. Impacts on wetlands and other waters of the U.S. from the continuation of commercial shellfish operations in Drakes Estero for an additional 10 years under alternative B are described as follows.

Under this alternative, offshore infrastructure and operations would continue on approximately 138 acres of culture beds in intertidal wetlands and subaquatic habitats, resulting long-term adverse impacts on estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. This is due to the presence of bottom bags, cluster culture for shell hardening, anchors for bag lines lying on the bottom substrate, and approximately 5 miles (7 acres) of racks. Under this alternative, DBOC would replace or repair 50 racks in 2013 and 25 racks in 2014. DBOC has previously reported that 50 racks totaling 3.75 acres were identified as “Needs repair – Inactive.” These racks are in relatively poor condition, and it is estimated that 50 to 75 percent of the materials making up the racks would need replacement. This would result in the installation of between 1,700 and 2,500 posts in Drakes Estero in 2013, and between 380 and 750 posts in 2014. The installation of these posts would result in a localized, temporary disturbance of sediment.

Currently, a portion of the floating culture is conducted at those racks in need of repair, using either existing rack posts for tie-downs or concrete blocks as anchors (DBOC [Lunny], pers. comm., 2011h and 2012b^{iv}). Under this alternative, racks would be completely reconstructed in the same footprint, and once racks are repaired, floating culture adjacent to racks is expected to continue. Currently, some anchors are placed in areas occupied by eelgrass adjacent to racks. This alternative calls for the cultivation of purple-hinged rock scallops using floating bags and/or trays at the 1-acre site known as Permit Area 2 where no racks are located. Thus, it is assumed new floats and anchors would be installed at this location. For each of these areas, as anchors are retrieved and replaced when floating culture is maintained, sediment and eelgrass disturbances to the Estero bottom are expected resulting in localized adverse impacts to waters of the U.S. Details of the work would be presented to the USACE as part of the section 404 and section 10 permitting process.

Bottom bags containing Pacific oysters are placed on beaches and mudflats for approximately 9 months after transfer from racks and floating bags. Bottom bags are turned approximately once every month whereas bags with Manila clams are not turned and may remain on tidal mudflats or sandbars for up to 18 months. As bags are manually placed, lifted, or turned over on the Drakes Estero bottom, sediment agitation, suspension, and transfer are expected to result in temporary impacts on intertidal wetlands. Impacts due to bag manipulation are directly related to the substrate disturbance. DBOC also places Pacific oyster cluster hanging culture in some beds to finish hardening their shell for a period of three months. No wetlands or other waters of the U.S. would be permanently lost from bag and rack use. After bags or clusters are removed for oyster harvest or transfer, natural processes would be expected to resume in E2US3 and E2US1/2 wetlands until new bags or clusters are placed there. The length of time required for natural processes to resume would vary depending on the level of disturbance (Wisehart et al. 2007; Zieman 1976).

The offshore shellfish operation has historically used rack and culture bag components such as floats, spacers, and tubes that may unintentionally become dislodged and deposited in other mudflats and shorelines in Drakes Estero. While realizing this as an ongoing possibility, the degree and intensity to which materials become dislodged in the future is not measurable. Intertidal wetlands that receive loose debris, however, would incur localized, impacts. Section 7(b) of the existing SUP states that the “permittee will make best efforts to remove debris associated with aquaculture production operations including wood from racks, plastic spacers, unused shellfish bags, shellfish shells, and any other associated items” (NPS 2008b). A permit to continue commercial shellfish operations in Drakes Estero

would again be conditioned upon the requirement to regularly clean up loose debris, resulting in temporary adverse impacts to mudflats and shorelines as workers access these areas to collect the loose debris. Adverse impacts to wetlands and other waters of the U.S. would also be expected to result from DBOC cleanup procedures should workers disturb the soft bottom of Drakes Estero when retrieving loose debris from intertidal mudflats. However, these impacts are not expected to cause a noticeable increase in disturbances and sedimentation in wetlands and other waters of the U.S.

Alternative B includes the continued operation of boats and barges. DBOC staff use boats to access racks and bags for cultivation. Access to the floating/bottom bags and trays in the intertidal zones requires that boats navigate in shallow waters until they may be temporarily “beached” on the mudflat/sandbar bottom to allow personnel to access bags on foot during low tide. This action results in sediment disturbances on the estuarine intertidal sandbars and mudflats from footprints and boat hull scarring as well as propeller damage to subtidal and intertidal aquatic eelgrass beds (see “Impacts on Eelgrass”).

Alternative B would also include the continued existence of the onshore buildings and infrastructure. Minimal impacts on wetlands and other waters of the U.S. may occur from refuse and runoff entering the estuarine intertidal unconsolidated shore (E2US2), as well as continued routine maintenance of docks, tanks, and the washing area. A mobile residence located directly on the bank of the pond would remain in its current location, resulting in long term disturbances to the pond shoreline and potential accidental discharge of materials into the water from the residence porch directly situated next to the water. The accumulation of shell refuse material has the potential to encroach into the beach shoreline if not hauled to an offsite location. This would result in the covering of habitat that would otherwise be available for intertidal wetland plant species.

Dredging of the E2US mudflat wetland in the vicinity of the boat dock would be conducted once to improve motorized boat access. This dredging would take place in an area approximately 30 feet by 60 feet to a low-tide depth of 3 feet. This would result in the removal of approximately 200 cubic yards of sediment from the intertidal area under the dock. Installing a silt curtain around the work area and restricting work to occur only during low tide would likely be mitigating requirements of agency permitting. In the silt curtain, dredging activities would cause the temporary suspension of soil particles in the water column; however, suspended solids inadvertently escaping the silt curtain would be flushed from the work zone by daily tidal action. Because no vegetated wetlands would be permanently converted or lost, this action would be considered a temporary impact on the E2US2 intertidal sand flat. DBOC would be required to obtain a permit authorization from USACE for the dredging activity.

Alternative B would incur changes to wetlands and other waters of the U.S. as a result of climate change and sea level rise as described under alternative A.

As described above, alternative B would result in long-term moderate adverse impacts to wetlands and other waters of the U.S. because infrastructure placed in waters would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and water of the U.S. in the project area for an additional 10 years. Alternative B would also result in short-term minor adverse impacts during normal operations to manage culture bags, trays and racks. Also, dredging around the dock would result in the localized movement of suspended sediment lasting up to a week. Installation of new posts during rack repair would take a few months (outside of seal pupping season) in 2013 and again in 2014. This would also cause a localized increase in sedimentation; a short-term minor adverse impact.

Upon expiration of the SUP in 2022, removal of commercial shellfish infrastructure and the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wetlands and other waters of the U.S. in Drakes Estero. Impacts to wetlands and other waters of the U.S. associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wetlands and other waters of the U.S. in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include coastal watershed restoration projects in the Seashore (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project) and monitoring/managing invasive species as described under alternative A. Based on the information above, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative B, would result in a long-term moderate adverse cumulative impact. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on wetlands and other waters of the U.S. beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative B would be short-term, minor, and adverse and long-term, moderate, and adverse. In the 138 acres of documented culture beds, bottom bags with anchors and floating lines on up to 84 acres of tidal mudflats/sandbars and 5 miles (7 acres) of racks with floating bags/trays and anchors in subaquatic habitats would continue to occupy estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Impacts associated with these offshore structures would include intermittent disturbances to mudflats and sandbars from the placement and rotation of bags/trays, lines and anchors, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. The impacts associated with these actions would be slightly greater than alternative C but less than those described under alternative D. Onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, or functions of the wetlands and other waters of the U.S. for an additional 10 years. Temporary impacts would be associated with dredging under the new dock. Dredging would occur in a 30-by 60-foot area at the dock. Approximately 1,700 to 2,500 2-inch by 6-inch posts would be installed outside harbor seal pupping season during 2013, and approximately 380 to 750 posts would be installed outside the harbor seal pupping season in 2014. Dredging and rack installation and repair would adversely impact the silted

bottom of Drakes Estero. The post installation and rack repair would be conducted over a few months in each year, and impacts from dredging and post installation and rack repair would be expected to last one week (from disturbance) due to a localized increase in suspended sediments. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.

Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits, and complying with all permit conditions. By obtaining state and federal permits and complying with their conditions, DBOC would ensure that alternative B is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. DBOC has received written confirmation that shellfish operations fall in USACE jurisdiction and a permit application is required to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the USACE that any proposed fill is necessary because there are no practicable alternatives, as outlined in the EPA's section 404(b)(1) Guidelines" (USACE 2010).

NWP 48, described under "Laws and Policies" in this section, authorizes "discharges of dredged or fill material in waters of the U.S. or structures or work in navigable waters of the U.S. necessary for commercial shellfish aquaculture operations in authorized areas" (33CFR 330[B][48]), provided notification is submitted to the USACE and includes a compensatory mitigation plan, habitat assessment, and assessment of impacts to eelgrass. Dredging the area around the dock and installing a new dock would not qualify for the NWP 48, and would require a separate USACE permit.

Lastly, any future actions would be reviewed by NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wetlands and other waters of the U.S. are the same as described under alternative B. The offshore SUP boundaries would be modified to a slightly smaller area; however, DBOC's racks and bags would occupy the same space as under alternative B. Production would be limited to 500,000 pounds of shellfish per year, as compared to 600,000 pounds per year under alternative B, although the overall acreage of shellfish growing beds and racks would be the same. The effort with respect to boat trips may be slightly reduced from conditions described under alternative B; however, the difference in production level is not expected to result in any difference in impacts to wetlands and other waters of the

U.S. Associated impacts to wetlands and other waters of the U.S. resulting from onshore operations and sea level rise would be the same as those described under alternative B.

As described under alternative B, alternative C would result in long-term moderate adverse impacts to wetlands and other waters of the U.S. in the project area because impacts would be readily apparent and would affect the structure, processes, and functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. In addition, alternative C would result in short-term minor adverse impacts during dredging around the dock because dredging would result in a localized increase in sedimentation, lasting up to a week. Installation of new posts during rack repair taking place for a few months in 2013 and again in 2014 would also cause a localized increase in sedimentation, a short-term adverse impact. Anchors used for floating culture would continue to be used around racks as described under alternative B, and purple hinged scallops will be grown in new floating bags with anchors in Permit Area 2 where no racks occur.

Upon expiration of the SUP in 2022, removal of commercial shellfish infrastructure and the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wetlands and other waters of the U.S. in Drakes Estero. Impacts to wetlands and other waters of the U.S. associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wetlands and other waters of the U.S. in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project) and monitoring/managing invasive species as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative C, would result in a long-term moderate adverse cumulative impact on wetlands and other waters of the U.S. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC commercial shellfish operations in 2022 and the restoration of onshore facilities, cumulative impacts on wetlands and other waters of the U.S. beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative C would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars and 7 acres of subaquatic habitat for the racks would continue to disturb estuarine subtidal/intertidal aquatic bed/rooted vascular (E1/2AB3), estuarine intertidal unconsolidated shore-mud (E2US3), and estuarine intertidal

unconsolidated shore-cobble-gravel-sand (E2US1/2) systems. Racks would be replaced on a schedule of 50 racks in year 2013 and 25 racks in year 2014. The replacements would occur over a few months in each year. Floating culture would likely continue, either attached to racks or using concrete anchors adjacent to racks, but at a reduced level compared to existing operations. Therefore, impacts to wetlands and other waters of the U.S. would be slightly reduced compared to alternative B. Of the 138 acres available for use, bottom bags have been placed on a rotational basis in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Other than the physical presence of structures in wetlands and other waters of the U.S., additional impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment. As under alternative B, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Temporary impacts would be associated with dredging under the new dock in a 30- by 60-foot area where the old dock is located and the installation/replacement of new rack infrastructure, including between 1,700 and 2,500 2-inch by 6-inch posts in 2012 and 380 to 750 posts in 2014. These actions would adversely impact the silted bottom of Drakes Estero due to a localized increase in sedimentation during the period of construction. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining the relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative C is consistent with relevant law and policy related to the management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. For the reasons described under alternative B, dredging the area around the dock and installation of a new dock would not qualify for the NWP 48, and would require a separate USACE permit.

USACE has provided written notification to DBOC that the commercial shellfish activities in waters of the U.S. are regulated by USACE and has advised DBOC to submit an application to ensure that its activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to "demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines" (USACE 2010).

Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wetlands and other waters of the U.S. are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact wetlands and other waters of the U.S. include:

- Production limit of 850,000 pounds of shellfish per year
- New onshore development
- Placement of a new intake pipeline

Similar to alternatives B and C, DBOC would have up to 84 acres of intertidal mudflats and sandbars available for bottom bag placement and 7 acres of racks in subaquatic habitats in Drakes Estero under this alternative. Impacts due to dislodged mariculture debris would be the same as those as described under alternative B. For the past two years, approximately 22 acres have been planted annually on a rotational basis. Under this alternative, DBOC may increase shellfish production up to 850,000 pounds per year (inclusive of all shellfish species). This level of production is approximately 40 percent greater than alternative B and 70 percent greater than alternative C. The increase in production may require additional bags/trays in the intertidal wetlands and other waters of the U.S. compared to alternatives B and C; however, this amount is undetermined. DBOC currently uses floating culture anchored to existing racks and concrete anchors placed on the Estero bottom adjacent to racks, and this activity would continue under this alternative. DBOC proposes to grow purple hinged scallops as part of this alternative that could require new floating bags and anchors. However, the 1-acre area known as Permit Area 2 would not be used to culture shellfish, as compared to alternatives B and C. Overall, impacts on wetlands and other waters of the U.S. from offshore operations could be highest under this alternative. Any additional floating bags and the placement of bottom bags on mudflats/sandbars would likely increase worker trips to manage the bagged shellfish compared to the other alternatives. Increased visits could cause additional boat and pedestrian impacts on the mudflats/sandbars from workers walking across the intertidal wetlands and from boat hulls and propellers scarring the Drakes Estero bottom.

Onshore operations and associated impacts on wetlands and other waters of the U.S. would be the same as those described under alternative B, with two additions. Alternative D would include the installation of dual 1,050-foot long, 4-inch diameter black PVC pipes to serve as the intake pipeline extending from the onshore facility into Drakes Estero to support the oyster processing operations. Dual pipes are required so that one pipe can remain in operation during times when the other pipe is maintained and cleaned. The dual pipes would be anchored by 10-foot spaced concrete blocks buried under the Estero bottom by hand (DBOC 2012b^v). This action would be considered a discharge of fill material in waters of the U.S. and a long-term impact to subtidal wetlands. The pipe would be expected to lie on the estuary bottom with minimal fill, impacting less than 0.1 acre of wetlands or other waters of the U.S., and there would be no loss (i.e., permanent conversion to uplands) of wetlands or other waters of the U.S. Alternative D includes two alternative building design plans presented by DBOC for improvements to the onshore facilities. Both of the onshore alternatives would call for the removal of some structures to be replaced by modern

buildings on upland areas. No new structures would encroach into wetlands or other waters of the U.S. The purpose of the new structures would be to serve multiple functions, including housing new setting tanks, provide a more modern working area for processing shellfish, and upgrade the interpretive center. Each building plan is expected to cause temporary exposure of local soils during construction and the potential risk of erosion and sediment transfer into intertidal wetlands of Drakes Estero until construction is completed and soils are either stabilized on site or removed. Mitigating actions preventing sediment transfer would include implementing standard BMPs, such as installing silt fencing/hay bales along the shoreline. Construction of the new building may have temporary minor adverse impacts on wetlands and other waters of the U.S. by increasing local turbidity levels from runoff and thus adversely affecting adjacent aquatic habitats for fish and shellfish. The building pad would avoid wetlands and is therefore not expected to cause adverse long-term impacts on wetlands and other waters of the U.S.

Alternative D would incur changes to wetlands and other waters of the U.S. as a result of climate change and sea level rise as described under alternative A.

As described above, alternative D would result in long-term moderate adverse impacts to wetlands and other waters of the U.S. in the project area because impacts would be readily apparent and would affect the structure, processes, and functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Alternative D would also result in short-term minor adverse impacts during dredging around the dock and placement of the new intake pipe because these actions would result in a localized increase in sedimentation, lasting up to a week. Installation of new posts during rack repair taking place for a few months in 2013 and again in 2014 would also cause a localized increase in sedimentation, a short-term minor adverse impact.

As under the other action alternatives, upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wetlands and other waters of the U.S. in Drakes Estero. Impacts on wetlands associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wetlands and other waters of the U.S. in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and monitoring/managing invasive species as described under alternative A. The impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative D, would result in a long-term moderate adverse cumulative impact. Alternative D would contribute an appreciable adverse increment to the overall cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on wetlands and other waters of the U.S. beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

During the life of the 10-year permit, impacts on wetlands and other waters of the U.S. under alternative D would be short-term, minor, and adverse and long-term, moderate, and adverse. Actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars would continue under alternative D. Of the 138 acres available for use, bottom bags have been placed in approximately 22 acres of mudflats/sandbars each of the past two years and could be placed in up to 84 acres in Drakes Estero. Racks would be replaced or repaired, and the use of floating culture would continue adjacent to racks resulting in the use of concrete anchors. In addition to the physical objects placed in wetlands and other waters of the U.S., other impacts would include intermittent disturbances to mudflats/sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the mud bottom. Because of the potential for higher production under this alternative (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), the impacts associated with these actions would likely be greater than those under alternatives B and C but are still expected to be at a moderate level. As under alternatives B and C, onshore operations may cause a minimal decrease in wetland functions and values if refuse and runoff along the shoreline is not collected and hauled off site. No wetlands or other waters of the U.S. would be permanently converted to uplands under this alternative; however, impacts would be readily apparent and would affect the structure, processes, and/or functions of the wetlands and other waters of the U.S. in the project area for an additional 10 years. Temporary impacts include dredging under the new dock (in a 30-by 60-foot area) at the onshore facilities and the installation/replacement of new rack infrastructure including between 1,700 and 2,500 2-inch by 6-inch posts in 2013 and 380 to 750 posts in 2014. DBOC would also place a new 1,050-foot water collection pipeline along the bottom of Drakes Estero using concrete anchors. The construction of a new processing facility would occur on existing uplands. These actions are expected to result in minimal short-term, adverse impacts due to an increase in local turbidity levels. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.

Prior to undertaking any new or replacement activities under this alternative, DBOC would be responsible for obtaining all applicable permits and complying with all permit conditions. By obtaining relevant state and federal permits and complying with their conditions, DBOC would ensure that alternative D is consistent with relevant law and policy related to management of wetlands and other waters of the U.S. DBOC's commercial shellfish operations and any dredge or fill activities in the waters of the U.S. (including Drakes Estero and the pond behind the mobile homes) are subject to permitting by USACE, San Francisco Bay Regional Water Quality Control Board, CCC, and NMFS. Installation of the intake pipe, installation of a new dock, and dredging the area around the dock would require USACE permit authorization. NWP 48 (*Commercial Shellfish Aquaculture Activities*) was issued on February 21, 2012 with modifications. This permit authorizes "discharges of dredged or fill material in waters of the United States or structures or work in navigable waters of the United States necessary for commercial shellfish aquaculture operations in authorized areas" (33CFR 330[B][48]). Dredging the area around the dock and installing a new dock would not qualify for NWP 48, and would require a separate USACE permit.

USACE has provided written notification to DBOC that the activities are in USACE jurisdiction and has advised DBOC to submit a permit application to ensure that DBOC activities comply with USACE regulations. The letter goes on to note that, if an individual permit is required, DBOC will need to “demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency’ Section 404(b)(1) Guidelines” (USACE 2010).

Lastly, any future actions would be reviewed by the NPS under DO-77-1; however, minor water-dependent actions (such as the installation of the new dock and placement of the water intake line) are likely to be excepted from a statement of findings (per section 4.2.1 of NPS Procedural Manual 77-1; NPS 2002a).

IMPACTS ON EELGRASS

LAWS AND POLICIES

NPS is responsible for protecting native species on NPS lands. Eelgrass is a native aquatic plant species of special ecological importance that occurs extensively in Drakes Estero. Eelgrass meadows (otherwise known as eelgrass beds) are classified as a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA section 404(b)(1) guidelines developed by EPA. The guidelines are the environmental standards used by USACE in the evaluation of permits for the discharge of dredged or fill materials regulated under section 404 of the CWA. Under the 404(b)(1) guidelines, special aquatic sites are to be afforded greater protection than other waters of the U.S. because of their contribution to the overall environment. Special aquatic sites possess special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These sites are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region. Eelgrass beds such as those found in Drakes Estero would be considered “vegetated shallows” as described in the regulations implementing this provision of the CWA (40 CFR 230 implementing section 404(b)(1) of the CWA). Activities regulated under the CWA are reviewed locally by USACE San Francisco District. The most recent changes to the Nationwide Permits were released as a Final Notice on February 21, 2012 (33 CFR 330), and regional conditions to Nationwide Permit activities have been promulgated by the San Francisco District Office of the USACE. If the proposed action would take place in or adjacent to eelgrass beds, regional USACE conditions require that the landowner notify the USACE in advance of beginning the work (in accordance with General Condition Number 31). This notification must include a compensatory mitigation plan, habitat assessment, and extent of proposed project impacts to eelgrass beds. Further, as discussed under the “Impacts on Wetlands and Other Waters of the U. S.” section above, the California State Water Resources Control Board has denied without prejudice CWA section 401 state water quality certification for mariculture projects that may qualify for the Nationwide Permit 48 (San Francisco Bay Regional Water Quality Control Board 2012). As a result, even if a project qualifies for Nationwide Permit 48, applicants like DBOC must submit a separate section 401 Certification application to the San Francisco Bay Regional Water Quality Control Board for its review (San Francisco Bay Regional Water Quality Control Board 2012). Further, as stated by the CCC (2012c), a “NWP will not be valid for any qualifying activity until the Commission either concurs with a consistency certification or waives the requirement.” NPS has a commitment to regional conservation planning. NPS *Management Policies 2006*

for biological resource management (NPS 2006d, section 4.4 et seq.) also states, “in addition to maintaining all native plants and animal species and their habitats inside the parks, the Service will work with other land managers to encourage the conservation of the populations and habitats of these species outside parks wherever possible. To meet its commitments for maintaining native species in parks, the Service will cooperate with states, tribal governments, the U.S. Fish and Wildlife Service, NOAA fisheries, and other countries, as appropriate to...participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d)

Seagrasses (such as eelgrass beds in Drakes Estero) have been identified as essential fish habitat under the Groundfish Plan (PFMC 2008). Further, seagrasses are distinguished as habitat areas of particular concern, which is a subset of essential fish habitat that requires additional scrutiny during the consultation process under the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267).

In recognizing the importance of maintaining healthy populations of eelgrass for habitat and ecosystem functions, the Southern California eelgrass mitigation policy, which is a set of guidelines and requirements for eelgrass mitigation in the coastal zone of Southern California has been adopted (NOAA 2005). Similar guidelines for the entire State of California have been drafted by the NMFS and have been released for public review and comment (77 Federal Register 47 [March 9, 2012], pp. 29150-29151) Although the California Eelgrass Mitigation Policy has not been officially adopted for use by the agencies, the guidelines in that policy are based on the Southern California model. For coastal projects requiring review by NMFS, USFWS, and/or CDFG, this policy will provide the standardized interagency guidance on mitigating adverse impacts to eelgrass resources. For example, the mitigation policy has an exclusion clause for impacts less than 10 square meters, which can be used as a threshold in management decisions concerning eelgrass resources. In addition, mitigation guidelines specify the replacement of impacted eelgrass habitat at a ratio of 1.2:1 (as stated in “Appendix D” of the draft policy for impact areas specific to the region north of San Francisco Bay):

“For mitigation activities that occur concurrent to the action resulting in damage to the existing eelgrass bed resource, a ratio of 4.82 to 1 [transplant area to impact area] shall apply based on a 75 percent failure rate over the past 25 years [4 transplant actions]. That is, for each square meter of eelgrass bed adversely impacted, 4.82 square meters of comparable new eelgrass bed shall be planted in suitable conditions to support eelgrass mitigation. A total of 1.2 square meters of new eelgrass bed habitat shall be successfully established...for every square meter of eelgrass impacted.”

NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4) affords a high level of protection to maintain native species and natural processes. Directives include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them.” At the forefront of the NPS biological resource management philosophy is the goal of preserving the genetic stock of vegetation species naturally occurring in park lands, as stated under section 4.4.1.2: “The Service will strive to protect the full range of

genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity” (NPS 2006d). DO-77-1 (NPS 2002a) sets the policy framework for the evaluation of NPS projects and their impacts on wetlands, including seagrasses. This Director’s Order requires NPS “to avoid to the extent possible the long- and short-term impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands wherever there is a practicable alternative.” In addition, NPS *Management Policies 2006* establishes a long-term goal of “net gain” in wetland habitat based on restoration of wetlands that have been degraded or lost due to past human activities (NPS 2006d).

METHODOLOGY

Impacts to submerged aquatic vegetation such as eelgrass are typically assessed at the level of the action, such as disturbance related to a specific land use in an estuarine habitat. At that scale, impacts can be evaluated in terms of areal extent (square feet), which allows for appropriate regulatory decision-making in terms of avoiding or minimizing the impact, and finally mitigating for the impact (see discussion above under “Laws and Policies”). In assessing eelgrass impacts for this EIS, a determination of exact acreage cannot be quantified for alternatives B, C, and D because the impacts are systemic (i.e., related to activities that are occurring throughout Drakes Estero, not just at a single localized site) and would change from day to day over the course of the 10 year permit period. Approximate quantifications are provided in the impact analysis based on interpretation of aerial photography, which is consistent with other studies under similar conditions, as cited below. Finally, research conducted in Drakes Estero on eelgrass density, coverage, general ecological relationships, and/or impacts from shellfish operations, is limited to a few unpublished masters theses and observational data from NPS. To improve the impact analysis on eelgrass, information from primary literature sources (i.e., those that satisfy the criteria for “primary references” as described in Chapter 1: “References Used for Impact Analysis”) was used, particularly published research in ecosystems with similar geographic and ecological setting as Drakes Estero. This was supplemented with the analysis and conclusions of the NAS review on eelgrass (NAS 2009). In addition, this included research in Drakes Estero conducted by Grosholz (2011b) documented the presence of nonnative invasive species tunicate *Didemnum* colonies growing on the distal portions of the leaf shoots of the eelgrass, and recent published literature from other ecosystems on tunicate colonization and dispersal (e.g., Herborg, O’Hara, and Therriault 2009; Carman and Grunden 2010, Simkanin et al. 2012; Morris and Carman 2012).

To assess the impact of propeller damage on eelgrass in Drakes Estero, recent high-resolution aerial photography was reviewed, and propeller damage lines were digitized by VHB using GIS technology. The source for the aerial photographs used in this analysis was CDFG imagery taken in 2010 (CDFG 2010d). The methodology used in this analysis draws from Zieman (1976), and more recently from NPS (2008a). In particular, propeller damage (also referred to as propeller “scarring”) of seagrasses is a common occurrence in shallow estuarine habitats, the effects of which can easily be observed as linear, dark signatures through seagrass beds on high-resolution aerial photography (Zieman 1976). Though the research presented in Zieman (1976) was conducted in Florida with different species of seagrasses, the aerial interpretation methodology developed is broadly applicable to seagrass research in a wide range of shallow estuarine habitats, such as Drakes Estero.

The total estimated linear distance of propeller scarring in Drakes Estero was estimated at 8.5 miles. Scars identified on the aerial images were digitized as lines in GIS, and the lengths of those lines were determined from the GIS shapefiles and then summed to produce an overall linear estimate. VHB's interpretation of propeller scarring on the 2010 aerial photographs (CDFG 2010d) was limited to areas that were clearly identifiable as scars. Based on previous studies, this typically results in an underestimate of total scar length in shallow estuaries, because not all propeller scars will be visible from aerial photography (Zieman 1976; Sargent et al. 1995; NPS 2008a). Therefore, the total linear distance of eelgrass scarring in Drakes Estero based on this analysis is likely an underestimate. Due to the large variability among the widths of scars, this analysis method was not suited for calculating a comparable quantity for comparison with the 50-acre quantity reported by NAS (2009). The width of the scars that were identifiable on the photographs varied from approximately 3 feet where a single track is visible (assumption based on the minimum width detectable at the scale and resolution of the aerial photographs) to 60 feet near the main channel in Schooner Bay; therefore, no uniform width was assigned to this estimate. Further, it was assumed that any scars visible at the scale of photography used in this analysis represented areas where eelgrass had been removed down to the level of the substrate (i.e., propeller damage that exposed the substrate so that it was visible on the photograph at 1:600 scale). The interpretation of propeller scarring on the 2010 aerial photographs (CDFG 2010d) was limited to areas that were clearly identifiable as scars; therefore, the 8.5-mile total is likely an underestimate. Scarring observed in algae, which appeared as brighter green zones on the photographs, was not included in the analysis (see figure 3-4).

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on eelgrass would be slightly detectable and localized (affecting a small segment of the population in the project area), and would result in limited change to eelgrass meadows or natural processes (such as eelgrass colonization and/or regeneration).
Moderate:	Impacts on eelgrass would be readily apparent and would affect eelgrass meadows or natural processes (such as eelgrass colonization and/or regeneration) in the project area.
Major:	Impacts on eelgrass would be readily apparent, widespread, would substantially affect eelgrass meadows or natural processes (such as eelgrass colonization and/or regeneration) in the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

In summarizing the effects of oyster cultivation on eelgrass in Drakes Estero, the NAS concluded:

“Limited observations of eelgrass in Drakes Estero demonstrate absence of eelgrass directly under oyster culture racks and from propeller scar damage attributable to boats operated by the oyster farm. Mariculture activities had an impact on about 8% of the eelgrass habitat in Drakes Estero in 2007: 1% of eelgrass acreage was displaced by oyster racks and 7% was partially scarred by boat transit through the eelgrass beds. Research elsewhere demonstrates that damaged eelgrass blades have rapid regeneration capacity and that eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration. Eelgrass habitat in Drakes Estero has doubled from 1991 to 2007 a trend seen in some other west coast estuaries.” (NAS 2009)

Under alternative A, the termination of DBOC activities in Drakes Estero would remove the actions associated with shellfish operations that result in direct damage to eelgrass habitat, particularly propeller scarring and shading effects from oyster racks (see discussion under alternative B). This would result in beneficial impacts on eelgrass, because eelgrass would no longer be subject to physical damage by DBOC boat propellers and, as such, would be expected to recolonize areas that have been disturbed by boat propellers (Waddell 1964, as cited in Simenstad and Fresh 1995; Zieman 1976). In addition, although direct measurements of effects on eelgrass from boat wake erosion and propeller-induced turbidity have not been made in Drakes Estero, literature on similar ecosystems (e.g., Thom et al. 2003) suggests that these phenomena could occur from boat operations. Under such conditions, alternative A would also result in beneficial impacts on eelgrass because eelgrass would no longer be subject to the potential for erosion created by DBOC-boat-generated waves; and (2) eelgrass would no longer be subject to the potential for temporary increases in turbidity caused by boat propellers disturbing and re-suspending bottom sediments. Each of these conditions would likely result in increases in density, biomass, and primary productivity of eelgrass due to the cessation of DBOC boat traffic in Drakes Estero.

NAS (2009) discussed an increase in eelgrass between 1991 and 2007. The conclusion from the NAS report was that eelgrass was expanding despite the ongoing commercial shellfish operations but notes this trend was not only observed in Drakes Estero. The NAS report did not evaluate the potential reasons that could be attributed to the expansion.

Removal of approximately 4,700 posts (2-inch by 6-inch boards) that support the shellfish racks would be expected to cause temporary increases in sedimentation (lasting 2 to 3 months). Standard BMPs such as silt curtains would be used to reduce turbidity effects from the temporary re-suspension of sediment during removal. Termination of DBOC activities would ultimately result in a beneficial impact on eelgrass because it would greatly reduce the potential for shellfish operation-related colonization and expansion of nonnative species such as colonial tunicates, which take advantage of the hard substrate created by the shellfish operations-related structures, and have recently been documented colonizing the leaf blades of eelgrass (Carman et al. 2009; Carman and Grunden 2010; Grosholz 2011b; see discussion under alternative B). Removal of DBOC activities would also reduce the potential for offshore shellfish cultivation structures to provide attachment sites for epiphytic macroalgae, which can compete with eelgrass for limiting resources such as sunlight (Hauxwell et al. 2001; Dumbauld, Ruesink, and Rumrill 2009; NAS 2010; see discussion under alternative B). When eelgrass blades become covered with species such as invasive tunicates, or shaded by macroalgae, this reduces the surface area of the leaves that are

exposed to sunlight for photosynthesis. Therefore, because alternative A would reduce the potential for such leaf-blade colonization/shading, the result would be long-term beneficial impacts on eelgrass due to the associated increases in primary productivity.

As described under alternative B, DBOC offshore infrastructure, including oyster racks and some bags, reduce coverage and density of eelgrass due to shading or preemption of space (NAS 2009). Under alternative A, all shellfish cultivation equipment in the 138 acres of growing areas would be removed, including the 5 linear miles (7 acres) of shellfish racks, as well as anchor lines and associated infrastructure used in floating culture. Removal would allow eelgrass to colonize substrates appropriate for eelgrass growth previously beneath shellfish operations-related structures (NAS 2009), resulting in short- and long-term beneficial impacts on eelgrass in these areas. New growth of eelgrass would provide additional natural habitat for the fish communities in Drakes Estero. This secondary benefit to the natural community is discussed in greater detail under “Impacts on Wildlife and Wildlife Habitat: Fish.”

NAS (2009) suggests that eelgrass productivity can be locally enhanced by bivalves. A detailed discussion of ecosystem benefits attributed to bivalves and bivalve cultivation is provided in “Chapter 3: Affected Environment”. Based on west coast research (Dumbauld, Ruesink, and Rumrill 2009), these positive ecosystem effects would be expected to be relatively minor in smaller west coast estuaries like Drakes Estero. This is because the nutrient dynamics in these systems are driven by coastal upwelling and a strong tidal cycle which flushes small estuaries like Drakes Estero on a daily basis. However, to the extent that localized beneficial effects from DBOC bivalves influence eelgrass productivity near DBOC beds and racks (see discussion under alternative B), the removal of DBOC-cultured bivalves under alternative A would result in adverse impacts on eelgrass at these sites.

As described above, alternative A would result in long-term beneficial impacts on eelgrass due to the termination of DBOC operations in Drakes Estero, as well as the removal of structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for expansion of invasive species (e.g., tunicates) and epiphytic macroalgae, which is already occurring in proximity to DBOC structures in Drakes Estero. Alternative A also would result in short-term minor adverse impacts because removal of infrastructure associated with commercial shellfish operations would result in localized, slightly detectable increases in sedimentation that would last 2 to 3 months and would reduce the amount of sunlight available for eelgrass photosynthesis during those times, but would result in limited overall change to eelgrass meadows or natural processes. Alternative A would also result in long-term beneficial impacts as removal of racks would allow sunlight to penetrate the water column in areas that are currently shaded by racks. In addition, accumulated aquaculture shell and other debris underneath and adjacent to racks will be removed by hand to reduce hard substrate in the potential eelgrass bed areas.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact eelgrass in the project area. These actions include planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative.

Planning and management activities may enable management activities such as administrative and research motorboat use in Drakes Estero. This would cause impacts on eelgrass similar to those discussed above caused by DBOC motorboats; however, boat use in Drakes Estero is subject to minimum requirement and minimum tool analysis under the Wilderness Act, would be highly infrequent, and timing and location of access could be limited. Therefore, the adverse impacts from these activities would be less than minor.

Coastal watershed restoration projects recently completed by the Seashore, including the Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project, could improve water quality in Drakes Estero, providing indirect long-term beneficial impacts on eelgrass in the project area. Additionally, because eelgrass is a resource targeted for protection under the MLPA, this designation would result in long-term beneficial impacts on eelgrass.

Based on the information above, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on eelgrass. Alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on eelgrass habitat due to the termination of DBOC operations in Drakes Estero, the removal of scarring with discontinued use of motorboats in Drakes Estero, and the removal of structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for the expansion of invasive species (e.g., tunicates) and macroalgae. There may be some highly localized adverse impacts on eelgrass associated with the removal of the commercially grown shellfish because they provide some benefits associated with nutrient cycling and water filtration; however, the overall long-term impacts of alternative A on eelgrass would be beneficial. Alternative A also would result in short-term minor adverse impacts on eelgrass because removing infrastructure related to commercial shellfish operations would result in localized, slightly detectable increases in sedimentation that would last two to three months, reducing the amount of sunlight available for photosynthesis during that time. BMPs would be used to reduce turbidity effects from temporary resuspension of sediment during removal activities, and the overall impact would result in limited change to eelgrass meadows or natural processes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.

With respect to eelgrass, alternative A is consistent with relevant law and policy because it would preserve and enhance (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes encouraged by NPS *Management Policies 2006*.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact eelgrass include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic

As described in chapter 3, extensive beds of eelgrass are present throughout Drakes Estero (Wechsler 2004^{vi}; NAS 2009). DBOC activities, particularly continued boat traffic, adversely impact eelgrass biomass and abundance because plants are uprooted or otherwise physically damaged by boat propellers (NAS 2009). Propeller damage (also referred to as propeller scarring) of seagrasses is a common occurrence in shallow estuarine habitats. Recovery time for seagrasses is influenced by factors such as the physical conditions at the site and the amount of damage. Once a propeller scar is created, wave action or fast-moving currents can lead to erosion in the scar, resulting in scouring and deepening of the disturbed area. Heavily scarred beds may also be prone to further damage or destruction by severe storms, as noted by Fonseca and Bell (1998) in shallow embayments in North Carolina.

Due to NPS prohibitions on motorized vessels, pursuant to the Point Reyes Wilderness Act of 1976, motorized boats used in DBOC's commercial shellfish operations are the primary contributing factor to propeller scarring in Drakes Estero (NAS 2009). Although the existing SUP requires DBOC to submit a boating operations plan that would designate primary navigation routes designed to minimize impacts on eelgrass, DBOC has not submitted this plan. Propeller scars visible on the 2010 high-resolution aerial photographs (CDFG 2010d) show that DBOC vessels transit through eelgrass, resulting in readily observable propeller damage across many areas of Drakes Estero.

In addition, DBOC operations adversely impact eelgrass cover and density because boats disturb the bottom substrate (Anima 1991^{viii}), thereby adversely affecting the rooting medium for eelgrass. Eelgrass regrowth into propeller scar areas can be relatively rapid (weeks), or it can take as long as two to five years, depending on the severity of the impact on the substrate or the root systems (Waddell 1964, as cited in Simenstad and Fresh 1995). Further, "propeller wash" (i.e., water turbulence behind propellers in boat wakes) and boat-generated waves are known to erode eelgrass along the edges of navigation channels, a phenomenon that has been documented for pleasure craft and ferryboats on the west coast (Thom et al. 2003) and in the case of clam harvesting boats on the east coast (Thom et al. 2003; Peterson, Summerson, and Fegley 1987). Finally, boat traffic can cause temporary increases in water column turbidity due to resuspension of sediments, resulting in an increase in turbidity that can reduce the depth to which sunlight penetrates the water column. Since sunlight is a requirement for photosynthesis, and plants must photosynthesize to add biomass, boat-induced turbidity can result in temporary reductions in photosynthesis and can stall or reverse biomass accumulation (Crawford 2002). It is anticipated that regardless of the regrowth and recovery rates of eelgrass in Drakes Estero, the amount of scarring under alternative B would remain similar to that observed in the 2010 aerial photographs (i.e., while older scars may regrow, new scars would form as a result of ongoing operations).

Based on research conducted in Drakes Estero, structures used for shellfish cultivation have been shown to reduce coverage and density of eelgrass due to shading or preemption of space (e.g., Wechsler 2004^{viii}; NAS 2009). Similar results have been found underneath structures used for oyster cultivation in other California estuaries, e.g., Humboldt Bay (Rumrill and Poulton 2004), and throughout the west coast (Preggnall 1993; Simenstad and Fresh 1995; Ruesink et al. 2005; Everett, Ruiz, and Carlton 1995; Tallis et al. 2009), although it should be noted that these studies describe various oyster culturing techniques and structures, not all of which are used by DBOC. Reduced coverage and density of eelgrass under or adjacent to shellfish operation-related structures have an associated reduction in primary productivity of eelgrass, because there is less leaf area available to photosynthesize (Everett, Ruiz, and Carlton 1995; Rumrill and Poulton 2004; Tallis et al. 2009; NAS 2010). In addition, lower eelgrass abundance results in a reduction of habitat for wildlife species that use eelgrass for nursery grounds, refuge, and food (Simenstad and Fresh 1995; Dumbauld, Ruesink, and Rumrill 2009; NAS 2009). See “Impacts on Wildlife and Wildlife Habitat: Fish” for additional detail on how this would affect fish species in Drakes Estero.

As documented in NAS (2009), the 7 acres (5 miles) of rack structures impede the ability of eelgrass to colonize and grow beneath the racks, resulting in direct impacts to eelgrass in these areas. DBOC has identified practices for growing purple-hinged rock scallop in Area 2 (1 acre), which currently has no infrastructure to support aquaculture activities. In their June 5, 2012 letter, DBOC stated that in order to grow purple-hinged rock scallops in Area 2, new floats and anchors would need to be added to this area to accommodate the new culture methods (DBOC 2012b^{ix}). The impacts associated with new activities in Area 2 would be direct and ongoing.

As noted in NAS (2009), structures associated with commercial shellfish operations provide habitat documented to support invasive nonnative species such as *Didemnum*, and these structures provide stable habitat that may have supported the expansion of *Didemnum* to other areas and habitats of Drakes Estero. Although hard structures such as oyster racks and bags represent a point of introduction and/or expansion for this species (Bullard, Lambert, et al. 2007; Simkanin et al. 2012; Morris and Carman 2012), recent research has shown that this species has the capacity to colonize soft substrates such as eelgrass blades (Carman et al. 2009; Carman and Grunden 2010; NAS 2010). Invasive tunicates have been recently observed colonizing eelgrass blades in Drakes Estero (Grosholz 2011b). Tunicates on eelgrass blades reduce the portions of the blades exposed to sunlight for photosynthesis; therefore, in areas where *Didemnum* can colonize eelgrass blades, there would be a reduction in primary productivity and biomass of eelgrass (Carman and Grunden 2010).

In addition, bivalve cultivation structures provide potential attachment sites for epiphytic macroalgae (e.g., *Ulva* spp.). When this type of growth occurs adjacent to eelgrass, the macroalgae can compete with eelgrass for important resources such as light, thereby reduce the effective photosynthetic surface of the eelgrass blades, which can lead to a reduction in primary productivity as noted above (Hauxwell et al. 2001; Dumbauld, Ruesink, and Rumrill 2009).

Shellfish operations can also have beneficial impacts on eelgrass due to the beneficial effects normally attributed to filter-feeding bivalves in estuaries (Newell and Koch 2004). Studies of bivalve cultivation in estuarine systems worldwide have noted that filter feeders such as oysters and clams remove suspended particles from the water column during feeding, which has the potential to reduce turbidity and increase light penetration, a benefit for photosynthetic organisms such as eelgrass (Peterson and Heck 1999, 2001;

NAS 2010). Deeper light penetration through the water column has the potential to expand the range over which submerged aquatic vegetation can live on the bottom substrate. Further, researchers have noted the potential for increased fertilization from “biodeposits,” or the byproducts of bivalve feeding, which would potentially stimulate growth of seagrasses through increased nutrient availability, which can, in turn, increase biomass and abundance (Newell and Koch 2004; NAS 2010). A more detailed discussion of the beneficial ecosystem effects of filter feeders is provided in chapter 3 under “Biogeochemical Cycling.”

However, it should be noted that most of the studies showing the beneficial effects of bivalve cultivation (such as water clarity and sediment nutrient enrichment) were conducted in estuaries with relatively turbid waters full of particulates, with low to moderate tidal flushing. By contrast, Drakes Estero is not a highly turbid coastal embayment (NAS 2009), so bivalve contributions to water clarity would likely be highly localized. Further, smaller west coast estuaries like Drakes Estero are exposed to a relatively large tidal cycle in which they are flushed with nutrient-rich water from ocean-derived coastal upwelling, a phenomenon that controls summer nutrient cycles and productivity in such coastal systems (Largier, Hollibaugh, and Smith 1997; NAS 2009). Clarity and productivity characteristics are also due in part to the relatively small watersheds that feed into coastal lagoon systems like Drakes Estero, because small watersheds do not tend to contribute large volumes of suspended sediments and organic detritus. Under such conditions, bivalve contributions to nutrient replenishment would be relatively small, perhaps only locally detectable under or immediately adjacent to commercial shellfish beds or structures (Dumbauld, Ruesink, and Rumrill 2009; NAS 2010).

Under alternative B, DBOC would repair or replace 50 inactive-dilapidated racks in 2013 and repair an additional 25 active racks in 2014. This would result in the installation of approximately 1,700 and 2,500 posts in Drakes Estero in 2013 and between 380 and 750 posts in 2014. The installation of these racks would result in localized, temporary disturbance of sediment during installation. During rack repair and/or replacement activities, there is potential for disturbance of sediment, physical damage to eelgrass plants, and disturbance of eelgrass habitat. Rack installation would require the use of BMPs, such as a silt curtain. Under alternative B, the impacts to eelgrass associated with rack repair and/or replacement, and the addition of floating culture infrastructure, would be expected to be short-term minor adverse because repair/replacement of shellfish structures would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis during the activity.

As described above, alternative B would result in long-term moderate adverse impacts on eelgrass in Drakes Estero for another 10 years. Impacts would be readily apparent and would affect eelgrass meadows and natural processes (such as eelgrass colonization and regeneration) through the continuation of propeller scarring, disturbance of sediment, maintenance of structures that preempt space and shade out habitat, and potential for expansion of invasive species such as *Didemnum*.

Upon expiration of the SUP in 2022, the removal of racks and bags from Drakes Estero and conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes to impacts on eelgrass in Drakes Estero. Particularly, the cessation of commercial shellfish operations in Drakes Estero would remove structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for expansion of invasive species (e.g., tunicates) and macroalgae. In addition, propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), the potential for boat wake erosion, and the potential for temporary increases in turbidity from sediment resuspension would cease. Prolonging the presence of nonnative species under alternative

B could hinder NPS efforts at invasive species management in Drakes Estero and could lengthen the period of time before a natural eelgrass community could be re-established in areas where eelgrass is affected, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite cessation of the shellfish operation.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact eelgrass in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts on eelgrass. The beneficial impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative B, would result in a long-term moderate adverse cumulative impact on eelgrass. Alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

Conclusion

Overall, alternative B would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for another 10 years and the continued presence of commercial shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative B would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), potential boat wake erosion, and potential temporary increases in turbidity from sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that the amount of scarring under alternative B would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities and the presence of structures would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, the latter of which can compete with seagrasses for important resources like light. These effects would have a long-term moderate adverse impact on eelgrass, which would be readily apparent and would affect eelgrass meadows and natural processes (such as eelgrass colonization and regeneration) through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Mitigation for impacts to eelgrass would be required pursuant to California policy. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation sites. In general, impacts would be clearly detectable and could appreciably affect individuals or groups of species, communities, or natural processes. The NAS concluded that commercial shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset by the “rapid

regeneration capacity” for eelgrass and that “eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration” (NAS 2009). Although there are some highly localized beneficial impacts on eelgrass associated with commercial shellfish operations, the overall impact of alternative B on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

With respect to eelgrass, alternative B would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS *Management Policies 2006*.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact eelgrass are the same as described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC’s racks and bags would occupy the same space as under alternative B. DBOC would maintain and replace offshore racks, including 50 inactive racks in 2013 and 25 active racks in 2014. Further, since there are no purple-hinged rock scallops currently grown, new floats and anchors would need to be added to accommodate the culture of this species in Area 2. Production would be limited to 500,000 pounds of shellfish per year, as compared to 600,000 pounds per year under alternative B. However, because the overall acreage of shellfish growing beds and racks are the same and effort with respect to boat trips is likely similar to conditions described in alternative B, the difference in production levels is not expected to result in any difference in impacts to eelgrass. Therefore, the impacts of alternative C on eelgrass are the same as those described for alternative B.

Under alternative C, DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and spread of *Didemnum* from oysters. This includes modification of current harvest and distribution practices to ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero. DBOC would be responsible for implementing practices as part of normal operations.

As described above, alternative C would result in long-term moderate adverse impacts on eelgrass in Drakes Estero for another 10 years. As with alternative B, impacts would be readily apparent and would affect eelgrass meadows and natural processes (such as eelgrass colonization and regeneration) as described above.

Upon expiration of the SUP in 2022, the removal of racks and bags from Drakes Estero and conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes to impacts on eelgrass in Drakes Estero. Particularly, the cessation of shellfish

operations in Drakes Estero would remove structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for expansion of invasive species (e.g., tunicates) and epiphytic macroalgae, the latter of which can compete with eelgrass for light. In addition, propeller scarring (estimated 8.5 miles based on 2010 aerial photography), the potential boat wake erosion, and the potential temporary increases in turbidity from sediment resuspension would cease. Prolonging the presence of nonnative species under alternative C could hinder NPS efforts at invasive species management in Drakes Estero and could lengthen the period of time before a natural eelgrass community could be re-established in areas where eelgrass is affected, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite cessation of the commercial shellfish operation.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact eelgrass in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include planning and management activities, coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts on eelgrass. The beneficial impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative C, would result in a long-term moderate adverse cumulative impact on eelgrass. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative C would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to the operation of DBOC boats for an additional 10 years and the continued presence of shellfish infrastructure in Drakes Estero. DBOC activities in Drakes Estero under alternative C would allow the continuation of actions associated with commercial shellfish operations that could result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from sediment resuspension given the area of boat operations in Drakes Estero. It is anticipated that because the level of boat use would remain similar to existing conditions, the amount of scarring under alternative C would remain similar to that observed in the 2010 aerial photographs. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and approximately 7 acres of racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. However, DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for *Didemnum* to spread to other areas in the Estero through fragmentation. Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around structures in Drakes Estero associated with commercial shellfish operations.

In general, impacts would be readily apparent and would affect eelgrass meadows or natural processes through the continued effects of boat disturbance, shellfish infrastructure, and nonnative species. The NAS concluded that shellfish operations in Drakes Estero result in impacts on eelgrass from the presence of racks and from boat propeller scars, but that these impacts are somewhat offset by the “rapid regeneration capacity” for eelgrass and “that eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration” (NAS 2009). Although there would be some highly localized beneficial impacts on eelgrass associated with shellfish operations, the impact of alternative C on eelgrass would be moderate and adverse. The cumulative impact would be long-term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

With respect to eelgrass, alternative C would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under NPS *Management Policies 2006*.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact eelgrass are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact eelgrass include:

- Production limit of 850,000 pounds of shellfish per year

Under alternative D, DBOC could produce up to 850,000 pounds of shellfish meat annually. Impacts on eelgrass associated with alternative D would be expected to be greater than those associated with alternatives B and C, due to the likely increase in boat traffic and area of vessel operations needed to harvest the proposed 850,000 pounds of shellfish meat annually.

As described above, alternative D would result in long-term moderate adverse impacts on eelgrass in Drakes Estero. These adverse impacts would be readily apparent and of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero, and the increased use of bags and racks in shellfish operations for another 10 years. As with alternatives B and C, DBOC would maintain and replace offshore racks, including 50 inactive racks in 2013 and 25 active racks in 2014. Further, since there are no purple-hinged rock scallops currently grown, new floats and anchors would need to be added to accommodate the culture of this species in Area 2. Impacts could appreciably affect eelgrass meadows or natural processes (such as eelgrass colonization and regeneration).

Upon expiration of the SUP in 2022, the removal of racks and bags from Drakes Estero and conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes to impacts on eelgrass in Drakes Estero. Particularly, the cessation of commercial

shellfish operations in Drakes Estero would remove structures that currently inhibit eelgrass abundance and serve as potential points of colonization and added substrate for expansion of invasive species (e.g., tunicates) and epiphytic macroalgae, the latter of which can be detrimental to eelgrass due to shading. In addition, propeller scarring (estimated at 8.5 miles based on 2010 aerial photography) would cease, as well as the potential for boat wake erosion and temporary increases in turbidity from sediment resuspension. Prolonging the presence of nonnative species under alternative D could hinder NPS efforts at invasive species management in Drakes Estero and could lengthen the period of time before a natural eelgrass community could be re-established in areas where eelgrass is impacted, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite cessation of the commercial shellfish operation.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact eelgrass in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts on eelgrass. The beneficial impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative D, would result in a long-term moderate adverse cumulative impact on eelgrass. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative D would result in long-term moderate adverse impacts on eelgrass in Drakes Estero due to an additional 10 years of DBOC operations. DBOC activities in Drakes Estero under alternative D would allow the continuation of and potential increase in actions associated with commercial shellfish operations that result in damage to eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from sediment resuspension. It is anticipated that due to the likely increase in boat traffic and area of vessel operations that the potential for scarring may be increased from the levels observed in the 2010 aerial photography. Maintenance of offshore infrastructure would continue to preclude eelgrass colonization underneath the beds and racks. Further, the continuation of DBOC activities would increase the potential for colonization and expansion of nonnative species (e.g., colonial tunicates) and macroalgae, as described above. These adverse impacts would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with the increased level of production (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), and the increased use of bags and racks in shellfish operations, but are still expected to be of a moderate intensity. Impacts would be readily apparent and would affect eelgrass meadows or natural processes (such as eelgrass colonization and regeneration). Rack repair and replacement would result in short-term minor adverse impacts on eelgrass because these activities would result in localized, slightly detectable increases in sedimentation, reducing the amount of sunlight available for

photosynthesis. Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue. These beneficial impacts would be expected to be localized around shellfish operation-related structures. The cumulative impact would be long-term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.

With respect to eelgrass, alternative D would not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the U.S. afforded additional consideration under the CWA; (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan; and (3) native species and natural processes (including native species management) under *NPS Management Policies 2006*.

IMPACTS ON WILDLIFE AND WILDLIFE HABITAT: BENTHIC FAUNA

LAWS AND POLICIES

NPS Management Policies 2006 for biological resource management states that “the National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems” (NPS 2006d, section 4.4 et seq.). Directives for maintaining native species include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and, minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them.” At the forefront of the NPS biological resource management philosophy is the goal of preserving the genetic stock of wildlife species naturally occurring in park lands, as stated under section 4.4.1.2: “The Service will strive to protect the full range of genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity” (NPS 2006d). Privately owned organisms such as cultured shellfish are not part of natural communities and ecosystems under *NPS Management Policies 2006*. Also, in accordance with 36 CFR 2.1 et seq., activities involving “possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state” biological resources is prohibited on park lands except where explicitly allowed by a park superintendent.

NPS has a commitment to regional conservation planning. *NPS Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) also states, “in addition to maintaining all native plants and animal species and their habitats inside the parks, the Service will work with other land managers to encourage the conservation of the populations and habitats of these species outside parks wherever possible. To meet its commitments for maintaining native species in parks, the Service will cooperate with states, tribal governments, the U.S. Fish and Wildlife Service, NOAA fisheries, and other countries, as appropriate to...participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d).

One of the population management objectives specified in section 4.4.1.1 states that the NPS will “prevent the introduction of exotic species into units of the national park system, and remove, when possible, or otherwise contain individuals or populations of these species that have already become established in parks” (NPS 2006d). Exotic species are defined as those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities. Exotic species are also commonly referred to as nonnative, alien, or invasive species.

Section 4.4.4 of NPS *Management Policies 2006* dictates the management of nonnative species. This section states that, in general, “new exotic species will not be introduced into parks. In rare situations, an exotic species may be introduced or maintained to meet specific, identified management needs” (NPS 2006d). NPS *Management Policies 2006* places a high value on and apply a high standard of protection to native species and natural processes in NPS units. Threats to these resources, such as invasive aquatic species, are aggressively managed, and the use of nonnative species as a management tool is an acceptable option only when “all feasible and prudent measures to minimize the risk of harm have been taken” and at least one of a number of criteria listed in section 4.4.4.1 have been met. Otherwise, *Management Policies 2006* states that all nonnative species that are not maintained to meet a park purpose will “be managed—up to and including eradication—if (1) control is prudent and reasonable,” and (2) the nonnative species “interferes with natural processes and the perpetuation of natural features, native species or natural habitats,” or meets any of the other criteria listed in this section (NPS 2006d).

Invasive Species Executive Order 13112 directs federal agencies to: (1) prevent invasive species introductions; (2) detect, respond rapidly, control, and monitor invasive species where introduced; and also, (3) “provide for restoration of native species and habitat conditions in ecosystems that have been invaded.” Executive Order 13112 also directs federal agencies to “not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

Finally, the California MLPA directs the reevaluation and redesign of California’s system of MPAs to increase coherence and effectiveness in protecting the state’s marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational, and study opportunities provided by marine ecosystems subject to minimal human disturbance. MPAs are located in and adjacent to Drakes Estero. Specifically, Point Reyes Headlands to the west of the project area and Estero de Limantour to the southeast have been designated as state marine reserves where the take of all living marine resources is prohibited. Drakes Estero is identified as a state marine conservation area where take of all living marine resources is prohibited, except for (1) recreational take of clams and (2) commercial aquaculture of shellfish pursuant to a valid state water bottom lease and permit. Due to the proximity of the proposed action to the MPAs, the MLPA was considered during preparation of this EIS. Section 124 of PL 111-88 does not relieve DBOC of its obligations to comply with the California MLPA.

METHODOLOGY

This section summarizes the impacts on benthic fauna from those actions that could potentially occur under each alternative. This impact analysis considers benthic organisms that are occurring naturally in Drakes Estero, as well as those that could be cultured under each alternative. The information used to evaluate impacts to native species, as well as nonnative species, is addressed below. In consideration of the different types of benthic organisms in the project area discussed in chapter 3, impacts are evaluated in the context of the type of impact (direct, indirect), the nature of the impact (i.e., type of disturbance to benthic fauna), the quality and amount of benthic fauna habitat impacted, and the potential for risks posed by proposed actions (e.g., introduction of nonnative species).

Impacts to estuarine benthic fauna are often difficult to assess because benthic environments can have a diversity of species, each responding differently to potential changes in ecological conditions. Impact analysis of benthic habitat and organisms typically involves detailed sampling of the benthic community, followed by a model-based approach such as risk assessment. No such studies have been conducted in Drakes Estero to date. The research available on benthic fauna in Drakes Estero is limited to a few unpublished masters theses and independent research conducted by marine scientists (Grosholz 2011b). To improve the impact analysis on benthic fauna, information from primary literature sources (i.e., those that satisfy the criteria for “primary references” as described in Chapter 1: “References Used for Impact Analysis”) was used, particularly published research in ecosystems with similar geographic and ecological setting as Drakes Estero. This was supplemented with the analysis and conclusions of the NAS review on benthic fauna (NAS 2009).

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on benthic fauna would be slightly detectable and would only affect a small segment of the populations or their natural processes and/or habitat in the project area.
Moderate:	Impacts on benthic fauna would result in readily apparent effects on populations, natural processes, or habitat in the project area.
Major:	Impacts on benthic fauna would result in readily apparent and substantial effects on benthic fauna populations, natural processes, or habitat in the project area. Loss of habitat or consistent disruptions may affect the viability of the species in the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

The termination of DBOC activities in Drakes Estero would remove actions associated with shellfish operations that could otherwise cause the introduction of nonnative species, such as bivalves or molluscan diseases (see discussion under alternative B). This would have a long-term beneficial impact on native bivalves and the local diversity of native benthic fauna because it would remove the potential for commercially-grown nonnative bivalves to escape cultivation, become established in Drakes Estero, and use resources that would otherwise be available to native benthic species (NAS 2010). The native invertebrates of Drakes Estero are typically adapted to the soft-bottom and eelgrass habitats common throughout the middle and upper reaches of Drakes Estero, where the commercial shellfish operations facilities are located (see “Benthic Fauna” discussion, chapter 3). The removal of shellfish operations (including 7 acres of racks and up to 88 acres of bottom bags) from Drakes Estero would also reduce the potential for introduction of bivalve diseases, which can be borne by cultivated shellfish (Friedman 1996; Burreson and Ford 2004). In addition, Pacific oysters and Manila clams have recently been documented to be naturalizing in Drakes Estero (Grosholz 2011b), and the removal of these nonnative cultivated species would reduce the risk of continued naturalization. The Pacific oyster has recently been identified as an invasive species in the San Francisco Bay region (San Francisco Bay Joint Venture Science Subcommittee 2011). Further, DBOC’s use of diploid stock, as opposed to sterile triploid stock, in cultivating these species increases the risk of naturalization (NAS 2004) (see “Benthic Fauna” discussion, chapter 3).

As previously discussed in “Chapter 3: Affected Environment,” the invasive tunicate *Didemnum* has become established in Drakes Estero on aquaculture structures, rocky outcrops, and as documented in Grosholz (2011b), on eelgrass. The removal of offshore commercial shellfish infrastructure would reduce the potential for new colonization of invasive tunicates, which, as the NAS reported, are associated with DBOC’s structures (NAS 2009) (see discussion under alternative B). Invasive colonial tunicates have the potential to smother habitats and inhibit the normal biological functions of benthic fauna (Osman and Whitlatch 2007; Mercer, Whitlatch, and Osman 2009). In addition, structures associated with shellfish operations can support other nonnative and native fouling organisms (which attach to underwater structures during their adult phase, inhibiting the normal function of the structures). The removal of these structures would reduce the available substrate over which fouling organisms could attach and grow. Finally, the ability of invasive tunicates to regenerate after being fragmented increases their dispersal capabilities (Bullard, Sedlack, et al. 2007), which can be worsened by activities associated with the maintenance of oyster bags and racks (NAS 2009). Therefore, the termination of commercial shellfish activities may reduce the risk of further dispersing the tunicate. Reducing the structures supporting invasive tunicates would have a long-term beneficial effect on native benthic fauna diversity.

Studies in Drakes Estero (Harbin-Ireland 2004^x; NAS 2009) and other systems (Castel et al. 1989; Nugues et al. 1996; Christensen et al. 2003; Lu and Grant 2008) have noted that the abundance of certain benthic species is lower beneath oyster racks relative to other natural habitats, such as nearby eelgrass beds (see discussion under alternative B). Therefore, the removal of DBOC’s offshore infrastructure would be expected to result in a slight increase in the abundance of certain species of native benthic invertebrates where the racks are currently located, mostly due to the expected regrowth of eelgrass in these areas. However, because structures associated with shellfish operations provide a different type of aquatic habitat compared with eelgrass beds, the species composition under these structures can be different.

To the extent that other benthic invertebrate species have colonized structures associated with shellfish operations, the habitat for these species would be removed. Regardless, the termination of bottom bag

culture in Drakes Estero would remove up to 88 acres of bags, potentially reopening habitat for native benthic fauna that would colonize the substrate currently being covered by the bags (NAS 2009).

As noted by the NAS (2009), bottom bag culture provides structured habitat for some benthic invertebrates. Although removal of the bags would result in a short-term adverse impact on benthic organisms that colonize the bags, alternative natural habitats (e.g., mudflats, sandbars or eelgrass beds) are expected to replace these structures. In addition, DBOC's regular practice of flipping the bags on the substrate directly disrupts the colonization by temporary physical displacement (i.e., disruption of bag contents and the substrate underneath). Further, when the bags are harvested, any native benthic organisms that have colonized the bags are also harvested, brought onshore along with the cultured bivalves, and killed during processing (Kaiser 2001) (see discussion under alternative B). Under alternative A, the termination of DBOC activities in Drakes Estero would remove the potential for such incidental mortality.

Finally, under alternative A the potential for substrate disturbance related to DBOC boat traffic in the main channel of Schooner Bay would no longer be present. Therefore, to the extent that these activities cause direct destruction of native benthic fauna by boat propellers or indirect displacement by disruption of benthic sediments, the removal of such activities would result in beneficial impacts on benthic fauna. Termination of DBOC operations under alternative A would result in the removal of approximately 4,700 posts (2-inch by 6-inch boards) that support the approximately 5 linear miles (or 7 acres) of shellfish racks in Drakes Estero. Removal of posts is expected to cause temporary localized disruption of benthic habitat when posts are removed, the effect of which would not be detectable in the benthic community.

As described above, alternative A would result in long-term beneficial impacts on benthic fauna because the termination of DBOC operations and associated commercial shellfish activities in Drakes Estero would remove cultivated nonnative species from Drakes Estero, reduce risk for the spread of nonnative and invasive species in the future, reopen habitat for native benthic fauna, and eliminate the potential for substrate disturbance related to DBOC boat traffic. Though some sediment resuspension is anticipated during removal of racks, any sedimentation resulting from this activity would be short-lived and would be reduced to the extent practicable using BMPs.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact benthic fauna in the project area. These actions include coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the CDFG MLPA initiative.

Recent coastal watershed restoration efforts in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) could improve water quality in Drakes Estero. Water quality improvements associated with these projects, such as reduced sedimentation in Drakes Estero, would result in beneficial impacts on native benthic fauna. The MLPA prohibits the take of any living marine resource in a marine protection area except recreational clam gathering and commercial shellfish aquaculture. Alternative A, in combination with the MLPA would result in only recreational clamming allowed in Drakes Estero. Though recreational clamming has the potential to disrupt sediment and impact benthic fauna habitat on mudflats and sandbars, Drakes Estero is known to be used only occasionally for

this type of activity. Impacts related to recreational clamming are therefore expected to be localized and negligible. Other efforts associated with the MLPA have had and will continue to have a beneficial impact on native benthic fauna.

The beneficial impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on native benthic fauna. Alternative A would contribute an appreciable beneficial increment to the overall beneficial cumulative impacts to native benthic fauna.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on native benthic fauna because the termination of DBOC operations and associated shellfish operations in Drakes Estero would remove shellfish operations from Drakes Estero and, therefore, reduce the risk for the spread of nonnative and invasive species in the future. Alternative A would result in the removal of structures related to shellfish operations in Drakes Estero. Some sediment re-suspension would be anticipated during the removal of the 7 acres of racks; however, any sedimentation resulting from this activity would be short-lived and would be reduced to the extent practicable using BMPs, making the impact undetectable in the benthic community and therefore negligible. Although artificial habitat for certain benthic species would be removed when DBOC's offshore infrastructure is removed, alternative natural habitats (e.g., eelgrass beds) would be expected to replace these structures. Further, the removal of structures under alternative A would remove substrates that support invasive tunicates and other fouling species. Native benthic species would benefit from the removal of offshore infrastructure, particularly from the approximately 88 acres of mudflats and sandbars where bottom bags can be placed (22 acres have been planted with bottom bags each of the past two years). Native benthic species are adapted to the soft-bottom habitat and eelgrass that would likely replace the structures related to shellfish operations once they are removed. The cumulative impact would be beneficial, and alternative A would contribute an appreciable beneficial increment to the beneficial cumulative impact.

Alternative A would be consistent with the guidance set forth in NPS *Management Policies 2006* for the maintenance and restoration of natural native ecosystems, including the eradication of nonnative species where these species interfere with natural processes and habitat (NPS 2006d). Alternative A would also be consistent with Executive Order 13112 regarding invasive species management. Finally, alternative A would be consistent with the California MLPA, regarding protection of marine life and habitats, marine ecosystems, and marine natural heritage, and improvements to recreational, educational, and study opportunities provided by marine ecosystems subject to minimal human disturbance.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact benthic fauna include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Production limited at 600,000 pounds of shellfish per year
- Species cultivated could include:
 - Permit Area 1: Pacific oysters and Manila clams
 - Permit Area 2: purple-hinged rock scallops

Based on graduate research conducted in Drakes Estero, the relative abundance of certain benthic invertebrates (i.e., the relative numbers of individuals in each species) was found to be lower directly underneath oyster racks than in nearby eelgrass habitat (Harbin-Ireland 2004^{xi}; NAS 2009). Harbin-Ireland (2004^{xii}) suggests that the decreased abundance in some species is due to the fact that benthic habitat underneath oyster racks is more exposed to predators (such as fish) that prey on invertebrates living in the substrate. This study further attributed the increased exposure to a lack of sufficient eelgrass cover, a phenomenon also observed by Everett, Ruiz, and Carlton (1995) underneath oyster racks in Coos Bay, Oregon.

Studies of bivalve cultivation in Europe (Castel et al. 1989; Nugues et al. 1996), New Zealand (Christensen et al. 2003), and Canada (Lu and Grant 2008) have noted reductions in benthic macroinvertebrates under structures or beds. In each of these studies, changes in the quality of the substrate, such as modification of texture due to erosion or sedimentation, or decreases in oxygen availability, were implicated as causing reductions in benthic invertebrates. Other studies have found little effect of shellfish structures on benthic species, or even increases on species diversity and abundance, when compared with nearby natural habitats – particularly when those habitats are open mudflats or otherwise lack structure (see review in Dumbauld, Ruesink, and Rumrill 2009; also DeGrave, Moore, and Burnell 1998; Mallet, Carver, and Landry 2006). Though Harbin-Ireland (2004^{xiii}) did not detect appreciable differences in sediment chemistry between oyster racks and eelgrass habitat (NAS 2009), changes in sediment texture were noted, indicating that erosion had taken place underneath the racks.

Under alternative B, a maximum of 84 acres of bottom bags would be placed in Drakes Estero at any given time. The actual acreage occupied by bottom bags varies year to year. According to DBOC proof-of-use reports, 22 acres of bags were planted in both 2009 and 2010. In addition, strings from rack culture are placed on these growing areas to harden shells for 3 to 9 months prior to harvest. Oysters and other bivalves cultured in bags on sandbars and mudflats have the potential to cover space that would otherwise be available for native benthic organisms to inhabit, particularly those that burrow in the soft substrate. However, some studies in west coast estuaries have shown that benthic invertebrate diversity can be higher in oyster beds than in adjacent unstructured habitat (NAS 2009). In one such study in Willapa Bay, Washington, benthic invertebrate densities were higher in on-bottom oyster beds than in adjacent mudflats, although both oyster and mudflat habitats showed lower density than eelgrass habitat (Hosack et al. 2006). To the extent that bottom bag bivalve cultivation provides habitat for benthic invertebrates, the bag culture method used by DBOC in Drakes Estero provides a potential artificial habitat for benthic invertebrates. However, it should be noted that this approach is not consistent with NPS *Management Policies 2006*, which are focused on protection of native species and natural processes. Further, commercial shellfish operations regularly disrupt this artificial habitat by turning the bags over on the substrate. This takes place approximately once a month for Pacific oysters. Manila clam bags do not require turning (DBOC [Lunny], pers. comm., 2011h).

Turning the bags over on the substrate has the potential to disrupt native benthic organisms living on or underneath the bags. Such disruption can also occur during storm events when the bags become dislodged from their locations on the mudflats. Additionally, native benthic organisms living in these bags are harvested along with the market-ready bivalves when the bags are lifted from the substrate and brought onshore for processing. Native benthic invertebrates unintentionally captured in this manner are killed in the process of harvesting the cultured oysters and clams. Such incidental mortality can cause a loss of native benthic invertebrates (Kaiser 2001; Kaiser et al. 1998).

The Pacific oyster, which is the primary species cultivated by DBOC, is not native to the Northern California region (Ruesink et al. 2005). Similarly, the Manila clam, a recent introduction into DBOC's shellfish cultivation stock, is a nonnative species. Such introductions have the potential to develop naturally breeding populations in Drakes Estero (NAS 2004, 2009). For example, the Pacific oyster has been observed growing independent of culture stock in Tomales Bay and Drakes Estero. In addition, the Manila clam has been observed growing independent of culture stock in Drakes Estero (Grosholz 2011b). The introduction of commercially grown nonnative bivalve species carries a certain level of risk (Padilla 2010). Nonnative species would reduce native bivalve access to food or habitat, leading to a decrease in local biodiversity of native bivalve species (Ruesink et al. 2005; Trimble, Ruesink, and Dumbauld 2009; Dumbauld, Ruesink, and Rumrill 2009; NAS 2010). The phenomenon of native species displacement has been observed for the Manila clam (e.g., Pranovi et al. [2006] in Italy), the native Olympia oyster (Trimble, Ruesink, and Dumbauld 2009), and other species introductions on the west coast (Ruesink et al. 2005). Based on extensive research in other areas (such as the mid-Atlantic region of the U.S.), use of sterile, triploid stock would reduce the potential for naturalizing populations of cultured species (for a review, see NAS 2004).

A production level of 600,000 pounds per year under alternative B would result in the continued addition and subsequent extraction of approximately 7.06 million individuals of nonnative shellfish in Drakes Estero (assuming all shellfish produced are Pacific oysters at a conversion rate of 100 oysters per gallon and 8.5 gallons per pound). This level of production would sustain the current risk for naturalization of cultured nonnative species into Drakes Estero (NAS 2004).

While bivalve cultivation can be used in certain settings to manipulate and modify systems with poor water quality (NAS 2009), such manipulation is not consistent with NPS management policies. Further, although introduced bivalves have been shown to have beneficial ecosystem impacts in certain settings through nutrient processing and organic enrichment of sediments (Newell 2004), the nutrient cycle in smaller west coast estuaries (such as Drakes Estero) is controlled by the tides and the important ocean-derived nutrients from upwelling currents—a condition on which filter-feeding bivalves would have limited influence (Dumbauld, Ruesink, and Rumrill 2009). Also, since the dominant eelgrass population in Drakes Estero controls the cycling of organic material to the sediments (NAS 2009), any organic contributions from introduced bivalves would be negligible by comparison.

NAS (2009) pointed out that historic importation of the Pacific oyster on cultch has resulted in the introduction of other nonnative species to the region, such as the pathogen *Haplosporidium nelsoni* (MSX) (Friedman 1996; Bureson and Ford 2004), as well as herpes viral infections (Friedman et al. 2005; Burge et al. 2005). In general, introduced shellfish diseases pose a threat to native populations of bivalves (NAS 2004; Burge, Griffin, and Friedman 2006; NAS 2010), although MSX only affects Pacific and eastern oysters. For commercial shellfish operations, the importation of seed from outside sources requires a permit, which is

administered through the CDFG. California Fish and Game Code section 2270 prohibits the importation of seed from infected or diseased areas. CDFG also regulates DBOC's operation with respect to the stocking of aquatic organisms, brood stock acquisition, disease control, importation of aquatic organisms into the state, and the transfer of organisms between waterbodies, which minimizes potential threats related to disease.

Under alternative B, the species cultivated by DBOC would remain generally the same, with the Pacific oyster continuing and the Manila clam allowed under this permit process representing the principal species stocked. However, DBOC would also maintain a 1-acre plot (Area 2, formerly known as Lease M-438-02) for growing purple-hinged rock scallops, a species that is native to the Pacific coast (Kozloff 1983). Cultured purple-hinged rock scallops typically require a hard artificial substrate for grow-out (Culver, Richards, and Page 2006). Based on correspondence from DBOC, floating culture would be used to grow scallops (DBOC 2012c^{xiv}), which would require new float and anchors in Permit Area 2. Floating culture would continue to be stabilized with 100-pound concrete anchors attached with ropes (DBOC 2012b^{xv}). The impacts on benthic fauna associated with scallop grow-out structures are expected to be similar to those currently used by DBOC for other species. In addition, because Drakes Estero is predominantly a soft-bottomed estuary with minimal hard substrate (Anima 1991^{xvi}; Press 2005), adult purple-hinged rock scallops are not likely to be found naturally growing in abundance in Drakes Estero due to the hard surface attachment requirement. Therefore, although the species is native to the region it is most likely to occur naturally in Drakes Estero only in larval form.

Of particular concern is the invasive colonial tunicate *Didemnum* (Lambert 2009), which has already been observed in association with DBOC's offshore infrastructure (NAS 2009). Because of this species' potential to smother habitats and inhibit normal biological functions in benthic fauna (Osman and Whitlatch 2007; Mercer, Whitlatch, and Osman 2009), it has become a major concern on both North American coasts (Bullard, Lambert, et al. 2007). Further, the ability of *Didemnum* to regenerate after being fragmented increases its dispersal capabilities (Bullard, Sedlack, et al. 2007), which can be exacerbated by maintenance of oyster bags and racks (NAS 2009; Morris and Carman 2012). Regular DBOC operations, such as turning bags over or relocating strings of rack oyster for hardening on sandbars, have the potential to cause fragmentation of *Didemnum* when present. In California (Foss et al. 2007; Heiman 2006), as elsewhere (Dijkstra, Sherman, and Harris 2007; Dijkstra, Harris, and Westerman 2007), invasive tunicates have been shown to reduce local biodiversity by displacing natural habitats and reducing the availability of resources used by multiple species. Because shellfish operation-related structures represent a point of colonization for invasive tunicates on the west coast (Herborg, O'Hara, and Therriault 2009), these invaders are likely to remain a problematic species.

In addition, Byers (1999) studied the invasion of a nonnative mud snail (*Batillaria attramentaria*), making specific reference to JOC. This organism was found to be detrimental to native snail populations, a point that was also noted in the recent NAS study of commercial shellfish operation effects in Drakes Estero (NAS 2009).

In a letter dated November 15, 2010, DBOC indicated that it manages invasive species by meeting the requirements set forth by its CDFG lease and Title 14 CCR to "minimize the chances of introducing invasive species or pathological microorganisms to Drakes Estero" (DBOC 2010s). Under this alternative, DBOC may replace the existing oyster wash system with a sediment basin that may also capture fragments of tunicates from reentering the bay from the onshore processing area.

Under alternative B, DBOC would repair or replace 50 inactive-dilapidated racks in 2013 and repair an additional 25 active racks in 2014. This would result in the installation of between 1,700 and 2,500 posts in Drakes Estero in 2013 and between 380 and 750 posts in 2014. The replacement of these racks would result in localized, temporary disturbance of sediment. During rack repair and/or replacement activities, there is potential for disturbance of sediment and benthic habitat. Rack replacement would require the use of BMPs. The impacts to benthic fauna associated with rack repair and/or replacement under alternative B would, therefore, be expected to be short-term and negligible.

As described under “Impacts on Wildlife and Wildlife Habitat: Fish” below, the posts and other treated wood associated with offshore infrastructure could adversely impact water quality, resulting from the release of copper leachates from pressure treated lumber. Metals leached into the environment from treated lumber are known to accumulate in the tissues of benthic organisms (Weis, Weis, and Proctor 1998). Existing posts do not pose a risk of copper leachate release due to the extended length of time in contact with water. Further, based on regulatory permit conditions that would likely be associated with rack repair activity, this assessment assumes that any new lumber used for rack repair would require an approved coating material in order to minimize the potential for release of copper leachates from treated wood into aquatic environments. Therefore, impacts from pressure treated wood on benthic fauna would be negligible.

Finally, under alternative B the potential for substrate disturbance related to continued DBOC boat traffic in the main channel of Schooner Bay would continue (Anima 1991^{xvii}). Therefore, to the extent that such activities cause direct destruction of native benthic fauna by boat propellers or indirect displacement by disruption of benthic sediments, the continuation of such commercial activities would result in adverse impacts on benthic fauna.

As described above, issuance of a 10-year SUP under alternative B would result in long-term moderate adverse impacts on benthic fauna for another 10 years because of DBOC operations and associated human activities in Drakes Estero would have the potential to introduce nonnative species and/or diseases, facilitate colonization and expansion of invasive tunicates, and cause physical disturbance to native benthic fauna and their habitat. These impacts would be readily apparent and would affect populations, natural processes, and/or benthic habitat in the project area.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to benthic fauna in Drakes Estero. Particularly, the cessation of bag cultivation in Drakes Estero would remove structured habitat for some benthic invertebrates (although alternative natural habitats such as eelgrass beds are expected to replace these structures), and would eliminate incidental mortality. In addition, removal of offshore infrastructure would reduce the potential for *Didemnum* colonization, and removal of associated shellfish operations (such as infrastructure maintenance, vessel traffic, and harvesting) would reduce the risk for further dispersal of this nonnative invasive tunicate via colonial fragments. Although shellfish operations would cease in 2022, the additional 10 years of nonnative shellfish cultivation in Drakes Estero under alternative B may allow these shellfish species to become further established in the Drakes Estero benthic community. For instance, the Manila clam is not native to the Pacific coast; however, a reproducing population has been observed in Drakes Estero (Grosholz 2011b). Prolonging the presence of these nonnative shellfish under alternative B could hinder NPS efforts at nonnative and invasive species management in Drakes Estero, and could lengthen the period of time before a natural benthic faunal

community could be re-established, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite cessation of the shellfish operation.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact native benthic fauna in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include coastal watershed restoration (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the MLPA as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts to native benthic fauna. The impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative B, would result in a long-term moderate adverse cumulative impact on benthic fauna. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative B would result in long-term moderate adverse impacts on native benthic fauna for an additional 10 years due to the continuation of DBOC operations and associated human activities in Drakes Estero, as well as the potential for such activities to introduce and/or facilitate the colonization of nonnative and invasive species. Specifically, the cultivation of nonnative species in Drakes Estero for an additional 10 years at production levels of 600,000 pounds of shellfish annually would result in the continued addition and subsequent harvest of approximately 7.06 million individual shellfish from Drakes Estero on an annual basis. Based on DBOC proof-of-use reports, the acreage of sandbars and mudflats occupied at this level of production would be 50 percent greater than that reported for 2008 in the 2009 NAS report. The effects on the natural benthic community from this would be readily apparent, including the continued use by nonnative species of resources that would otherwise be available to native species of bivalves and other benthic organisms, the introduction of molluscan diseases, and other harmful nonnative species being imported unintentionally (such as the invasive tunicate *Didemnum*). The use of both bottom bags and racks has been implicated in detectable changes in benthic communities. The continued maintenance and use of DBOC offshore infrastructure would result in a slight decrease in the abundance of certain benthic invertebrate species where the racks are currently located, while the continuation of bag cultivation in Drakes Estero would maintain artificial structured habitat for some benthic invertebrates. Rack repair and replacement would result in short-term negligible adverse impacts to benthic fauna, because the effects from these activities would not be detectable or measurable. Activities such as continued maintenance and harvesting would allow for incidental mortality to continue, as described above, which would have an adverse impact on native bivalves. Further, the continued use of offshore infrastructure would maintain the potential for *Didemnum* expansion, and associated shellfish operations (such as continued infrastructure maintenance, vessel traffic, and harvesting) would pose a risk for further dispersal of this nonnative invasive tunicate via colonial fragments. The potential for increase in overall coverage of *Didemnum* would have an adverse impact on species diversity. Lastly, the nonnative Manila clam and Pacific oyster would continue to be produced under this alternative, increasing their chance for naturalization (NAS 2004, 2009; Grosholz 2011b). DBOC's use of diploid stock rather than sterile triploid stock further increases the risk of

naturalization by cultivated species (NAS 2004). These impacts would be readily apparent on the populations, natural processes, and/or habitat of benthic organisms in the project area. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS *Management Policies 2006* in that it would not further the goal of policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The shellfish species that could be cultivated under this alternative are nonnative, with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative B would not be consistent with Executive Order 13112 regarding invasive species management.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact benthic fauna are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact benthic fauna include:

- A production limit of 500,000 pounds of shellfish per year
- Species cultivated could include:
 - Permit Area 1 (897 acres): Pacific oysters
 - Permit Area 2 (1 acre): purple-hinged rock scallops

Under alternative C, the offshore SUP would include 896 acres, 138 acres of which would be occupied by culture beds associated with the production of Pacific oysters and purple-hinged rock scallops. Pacific oysters would be cultivated in beds in the 896-acre Area 1, while purple-hinged rock scallop cultivation would be limited to the 1-acre Area 2. Manila clams would be removed from all growing areas under alternative C, minimizing the potential for this nonnative species to become established in Drakes Estero and use resources that would otherwise be available to native bivalves and other benthic fauna. The potential risk of nonnative bivalves establishing breeding populations in Drakes Estero is discussed in detail under alternative B. The reduction in shellfish production levels from 600,000 pounds under alternative B to 500,000 pounds under alternative C would result in a slight decrease in the impacts on benthic fauna described under alternative B due to the lower levels of production and the presumably lower number of cultured organisms in Drakes Estero (estimated at 5.88 million individuals, assuming all shellfish produced are Pacific oysters at a conversion rate of 100 oysters per gallon and 8.5 gallons per pound).

Under alternative C, DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and spread of *Didemnum* from oysters. This includes modification of current harvest and distribution practices to ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero. DBOC would be responsible for implementing practices as part of normal operations.

As described above, alternative C would result in long-term moderate adverse impacts on benthic fauna for another 10 years because of the continuation of DBOC operations and associated human activities in Drakes Estero during this period, which could introduce nonnative species and/or diseases, facilitate colonization and expansion of invasive tunicates, and cause physical disturbance to native benthic fauna and their habitat. These impacts would be readily apparent and would affect populations, natural processes, and/or benthic habitat in the project area.

As described under alternative B, upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to benthic fauna in Drakes Estero. Although shellfish operations would cease in 2022, the additional 10 years of nonnative species cultivation in Drakes Estero under alternative C may allow these nonnative species to become further established in the Drakes Estero benthic community (as mentioned above, purple-hinged rock scallops are native to the California coast but do not occur in abundance as adults in Drakes Estero). Prolonging the presence of these species under alternative C could hinder NPS efforts at nonnative and invasive species management in Drakes Estero, and could lengthen the period of time before a natural benthic faunal community could be re-established, as compared to alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact native benthic fauna in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the MLPA as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts to native benthic fauna. The beneficial impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative C, would result in a long-term moderate adverse cumulative impact on native benthic fauna. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative C would result in long-term moderate adverse impacts on benthic fauna due to an additional 10 years of commercial shellfish operations and associated human activities in Drakes Estero and the potential for such activities to introduce nonnative species and to facilitate the colonization and expansion of invasive species. Although Manila clams would no longer be cultivated under this alternative, the cultivation of Pacific oyster in Drakes Estero would have readily apparent effects on the communities of natural benthic organisms, including increasing the risk of introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate *Didemnum*). As discussed under alternative B, DBOC's use of diploid stock rather than sterile triploid stock increases the risk of naturalization by cultivated species (NAS 2004), although the potential risk under alternative C would be incrementally less than under alternative B. DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for *Didemnum* to spread to other areas in Drakes Estero through fragmentation. The use of both bottom bags and racks has contributed to detectable changes in benthic

communities. Because shellfish production limits would be less under alternative C compared to alternatives B and D, the level of impact on benthic fauna would be incrementally less; however, the impacts would still be readily apparent and would affect benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible (i.e., not detectable or measurable). Cumulative impacts would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.

The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS *Management Policies 2006* in that it would not further the goal of the policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. All species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero due to the low availability of hard substrate for attachment. Further, alternative C would not be consistent with Executive Order 13112 regarding invasive species management.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact benthic fauna are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact benthic fauna include:

- Production limit of 850,000 pounds of shellfish per year
- Cultivation of Pacific oysters, Olympia oysters, Manila clams, and purple-hinged rock scallops

Under alternative D, the range of species cultivated by DBOC would be expanded to include the Olympia oyster (in addition to the Pacific oyster, Manila clam, and the purple-hinged rock scallop) increasing the diversity of species, as well as increasing the offshore SUP to 1,082 acres. Manila clams are not native to the Pacific coast of North America, and have been shown to naturalize in areas where they have been introduced (Humphreys et al. 2007). Similar to the purple-hinged rock scallop (see discussion under alternative B), the Olympia oyster is native to the Pacific coast (Kozloff 1983) but requires a hard substrate for colonization and grow-out (Couch and Hassler 1989; Trimble, Ruesink, and Dumbauld 2009). As such, adult Olympia oysters are not likely to be found naturally growing in abundance in Drakes Estero. Inspections during the 1930s, as documented by Bonnot (1935), found no Olympia oysters growing in Drakes Estero. The historic presence of Olympia oysters in Drakes Estero has also been the subject of recent archeological work (Konzak and Praetzellis 2011; Babalis 2011), which found that Olympia oysters were of limited distribution in Drakes Estero even prior to the advent of large-scale commercial fishing on the California coast. Therefore, although the species is native to the region, the adult form is not likely to occur naturally in large numbers in Drakes Estero due to the low incidence of naturally-occurring hard substrates for attachment sites. The impact of such introductions would depend on the proportion of the native and nonnative species cultivated under alternative D, which are unknown

at this time. Finally, under alternative D, DBOC has sought permission to collect the larvae for Olympia oysters and purple-hinged rock scallops directly from Drakes Estero. The collection of larvae is not consistent with NPS *Management Policies 2006* (NPS 2006d) or with NPS regulations, which prohibit the collection of shellfish larvae (36 CFR 2.1 et seq.). More detail on collection methods is needed to determine whether this type of activity would be authorized. Any individuals brought in from outside sources would be subject to CDFG regulations.

Under alternative D, shellfish production levels would be increased to 850,000 pounds (estimated at 10 million individuals harvested annually, assuming all shellfish produced are oysters at a conversion rate of 100 oysters per gallon and 8.5 gallons per pound). This is a substantial increase from alternative C (500,000 pounds) and alternative B (600,000 pounds). As such, alternative D would result in a greater adverse impact on benthic fauna than alternatives B and C.

This would be the highest documented level of commercial production of shellfish in Drakes Estero, and accordingly, the risk of naturalization of nonnative species would be greater than under current conditions or alternatives B or C. As described above, alternative D would result in long-term moderate adverse impacts on benthic fauna for another 10 years because DBOC operations and associated human activities in Drakes Estero would continue for this period. This would increase the potential for shellfish operations to introduce nonnative species and/or diseases, facilitate colonization and expansion of invasive tunicates, and cause physical disturbance to native benthic fauna and their habitat. These impacts would be readily apparent and would affect populations, natural processes, and/or benthic habitat in the project area.

Similar to the other action alternatives, upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to native benthic fauna in Drakes Estero. Although shellfish operations would cease in 2022, the additional 10 years of nonnative species cultivation in Drakes Estero under alternative D may allow these nonnative species to become further established in the Drakes Estero benthic community. Prolonging the presence of these species under alternative D could hinder NPS efforts at ecosystem management in Drakes Estero and could lengthen the period of time required before a natural benthic faunal community could be re-established, compared to alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact benthic fauna in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the MLPA as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, these past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts to native benthic fauna. The beneficial impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative D, would result in a long-term adverse cumulative impact on native benthic fauna. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative D would result in long-term moderate adverse impacts on native benthic fauna due to an additional 10 years of DBOC operations and associated human activities in Drakes Estero. This would increase the potential for shellfish operations to introduce nonnative species to Drakes Estero and facilitate the colonization and expansion of invasive species. Specifically, the increase in shellfish production levels to 850,000 pounds shucked weight (approximately 10 million individual organisms harvested annually) represents a marked increase over alternatives B and C (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); therefore, it is assumed alternative D would result in the greatest level of impact on native benthic fauna among all alternatives. The cultivation of nonnative species in Drakes Estero would be readily apparent and would affect populations, natural processes, and/or the habitat of natural benthic organisms, including increasing the risk of introduction of molluscan diseases and expansion of other nonnative species (such as the invasive tunicate *Didemnum*). While certain species introduced under alternative D are native to the region (i.e., purple-hinged rock scallops and Olympia oysters), they are not abundant in Drakes Estero in adult form. The use of both bottom bags and racks has contributed to detectable changes in benthic communities. These impacts would continue to be readily apparent, affecting benthic populations, natural processes, and/or habitat in the project area. Activities related to rack repair and/or replacement would be temporary in nature and subject to BMP requirements; therefore, impacts on benthic fauna from rack repair and/or replacement would be negligible. Cumulative impacts would be long term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.

The continued introduction and maintenance of nonnative species in Drakes Estero would not be consistent with NPS *Management Policies 2006* in that it would not further the goal of these policies, which, in this case, would be to minimize the impacts of human activities on native benthic fauna populations. The species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is not likely to be found in abundance in Drakes Estero, and the Olympia oyster, which also prefers a hard substrate and is not abundant in adult form in Drakes Estero. Additionally, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per *Management Policies 2006* (NPS 2006d) or regulations. Further, alternative D would not be consistent with Executive Order 13112 regarding invasive species management.

IMPACTS ON WILDLIFE AND WILDLIFE HABITAT: FISH

LAWS AND POLICIES

NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) states that “the National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.” Directives for maintaining native species include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and, minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the

processes that sustain them.” At the forefront of NPS biological resource management philosophy is the goal of preserving the genetic stock of wildlife species naturally occurring in park lands, as stated under section 4.4.1.2: “The Service will strive to protect the full range of genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity” (NPS 2006d).

In addition, the Magnuson-Stevens Fishery Conservation and Management Act, as implemented by NMFS, requires that fishery management plans identify and describe essential fish habitat. The Pacific Fishery Management Council’s Groundfish Plan has identified seagrasses (such as the eelgrass beds in Drakes Estero) as essential fish habitat for groundfish species. Further, seagrasses are distinguished as habitat areas of particular concern, which is a subset of essential fish habitat that requires additional scrutiny during the consultation process. Impacts on essential fish habitat were discussed in detail under “Impacts on Eelgrass” above.

METHODOLOGY

This section summarizes the impacts on fish from those actions that could potentially occur from each alternative. The analysis presented is based in part on Wechsler’s 2004 report of fish and fish habitat, which is the only fish study available pertaining specifically to Drakes Estero. As a result, regional and national sources were also investigated and used in portions of the analysis where components of the aquatic environment were similar and applicable. Abundant studies have been conducted on seagrass landscapes and their associated fauna, and literature was available which reviewed trends, data gaps, and need for future research.

Wechsler sampled the fish community in Drakes Estero seasonally from December 2002 to January 2004. The intent of the study was to compare the fish assemblage in portions of Schooner Bay that had active oyster mariculture operations, to the fish assemblage of Estero de Limantour where oyster mariculture is absent. The fish in the subtidal portions of Schooner Bay were sampled adjacent to three randomly selected shellfish racks in and then at a distance of approximately 250 feet away from the same three racks. Fish in Estero de Limantour were sampled from an additional three randomly selected sites. The oyster racks in Schooner Bay were located in heavily vegetated eelgrass beds.

In an attempt to catch representative sample of all types of fish, sampling was conducted using a variety of nets, including trawls, gill nets, and minnow traps. Wechsler caught 3,128 fish in total, but due to difficulties during two sampling efforts, some data was not included in the study. As a result, the data used for the study reflected the 2,816 fish caught from successful sampling efforts, representing 29 species of fish. Forty-four percent of all fish were captured in Estero de Limantour, 36 percent of fish were captured at stations away from shellfish racks, and 26 percent of fish were captured at stations adjacent to the shellfish racks.

Since the Wechsler study is the only study of its kind conducted in Drakes Estero, the analysis in this section is supplemented by information from studies from other U.S. Pacific Coast estuaries and coastal lagoons. This additional level of analysis is intended to help establish a baseline of fish and fish habitat information that is relevant to the fish community in Drakes Estero. Data available from other U.S. Pacific Coast estuarine fish studies is relatively abundant and represents a variety of estuarine habitats. Several studies

used for the analysis were conducted in Humboldt Bay, California, which is larger in area than Drakes Estero, but has comparable eelgrass habitat and mariculture components to those of Drakes Estero.

In order to analyze the relationship between fish and fish habitat (such as eelgrass) in Drakes Estero, information was used from literature that presented broader overviews of estuarine landscapes with seagrass habitats. The information is useful to understand the ecology of seagrass habitat as it pertains to fish communities. Fish and fish habitat analysis is also supplemented by information presented in current fishery management plans produced by the PFMC. The plans are useful to understand characteristics related to essential fish habitat, as well as the fish species for which this habitat is designed to manage.

In consideration of the different types of fish species in the project area discussed in chapter 3, impacts are evaluated in the context of the type of impact (direct, indirect), the nature of the impact (i.e., type of disturbance to wildlife and wildlife habitat), the quality and amount of fish habitat impacted, and the potential for risks posed by proposed actions (e.g., introduction of nonnative species).

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on fish would be slightly detectable and would only affect a small segment of the population or their natural processes and/or habitat in the project area.
Moderate:	Impacts on fish would result in readily apparent effects on populations, natural processes, or habitat in the project area.
Major:	Impacts on fish would result in readily apparent and substantial effects on fish populations, natural processes, or habitat in the project area. Loss of habitat or consistent disruptions may affect the viability of the species or cause populations to relocate outside the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease and DBOC would be responsible for the removal of certain buildings and structures and all personal property.

As described in the “Impacts on Eelgrass” section of this chapter, alternative A would eliminate impacts on eelgrass habitat from commercial shellfish operations. This would allow eelgrass habitat to expand into areas previously lacking and could result in a beneficial impact on some fish species included the Groundfish Plan. Three of the 29 species (approximately 10 percent) identified in a study assessing the relationship between fish species present and shellfish operations in Drakes Estero (Wechsler 2004^{xix}), were listed in the Groundfish Plan (PFMC 2005), including leopard shark (*Triakis semifasciata*), starry flounder (*Platichthys stellatus*), and cabezon (*Scorpaenichthys marmoratus*). Based on the habitat descriptions in the Groundfish Plan (PFMC 2008), eelgrass is only one type of habitat used by these 3 species. Therefore, in the absence of

additional site-specific data, it is unclear to what degree these species may rely on eelgrass in Drakes Estero as an essential habitat element.

Studies of fish assemblages conducted in multiple central California coast estuaries (Monaco, Lowery, and Emmett 1992) indicate a greater diversity of Groundfish Plan species than that shown by Wechsler in 2004. For instance, brown rockfish (*Sebastes auriculatus*), bacaccio (*Sebastes paucispinis*), blue rockfish (*Sebastes mystinus*), and grass rockfish (*Sebastes rastrelliger*) are species managed under the Groundfish Plan that are strongly associated with central California coast estuaries (Monaco, Lowery, and Emmett 1992) but not included in Wechsler's (2004) report. Both juveniles and adults of these species can be associated with seagrasses in estuarine zones, including eelgrass habitat (PFMC 2005). Therefore, an expansion of eelgrass habitat could have beneficial impacts on some groundfish species and essential fish habitat included in the Groundfish Plan.

Areas of designated essential fish habitat pertaining to the Coastal Pelagic Species Fishery Management Plan also extend to the California shoreline and include Drakes Estero. The lateral boundary of essential fish habitat for species evaluated in this plan includes estuarine and marine surface waters from the shoreline of Drakes Estero extending 200 nautical miles offshore, where sea surface temperatures range between 10 degrees C to 26 degrees C (PFMC 1998). This area of essential fish habitat reflects the typical habitat requirements of these coastal pelagic species, which can be largely dependent on water temperature. For instance, the subpopulation of northern anchovy near Drakes Estero is typically found in waters ranging from 12 degrees C to 21.5 degrees C (PFMC 1998).

Of the five species included in the Coastal Pelagic Species Fishery Management Plan, the Pacific sardine and northern anchovy are more likely to be found in Drakes Estero than others. Like the northern anchovy, Pacific sardine habitat is limited by a range in water temperature. However, while sardines can be found in estuaries, they usually undergo all life stages in near shore and offshore environments (PFMC 1998). Northern anchovies can be abundant in estuaries and have been found in Drakes Estero (Wechsler 2004^{xviii}), but were observed in very low quantity relative to large schools of anchovies found in the greater subpopulation. With the limited information available about the use of Drakes Estero by these coastal pelagic fish species, it is unclear to what degree alternative A would provide benefits to the species and essential fish habitat included in the Coastal Pelagic Fishery Management Plan.

Additional essential fish habitat found in Drakes Estero is included in the Pacific Coast Salmon Fishery Management Plan. The effects of this alternative on federally listed salmon and/or their critical habitat in Drakes Estero are described in this chapter in the "Impacts on Special-Status Species" section.

The other fish species observed in the Wechsler (2004^{xix}) study, described above, are not listed in fishery management plans maintained by the Pacific Fishery Management Council. As such, Drakes Estero is not designated as essential fish habitat for these species. Five of these species (topsmelt [*Atherinopsis affinis*], three-spined stickleback [*Gasterosteus aculeatus*], staghorn sculpin [*Leptocottus armatus*], bay pipefish [*Syngnathus leptorhynchus*], and kelp surfperch [*Brachyistius frenatus*]) were the most prevalent species captured in the study, comprising approximately 89 percent of the total catch (Wechsler 2004^{xx}).

Wechsler (2004)^{xxi} noted that DBOC's offshore infrastructure had little effect on fish species abundance or community composition when compared with the other habitats that were sampled. The only trend noted was an increase in kelp surfperch, a structure-oriented fish typically associated with hard substrates such as oyster

racks (Wechsler 2004^{xxii}) (see discussion under alternative B). The idea that the structure from oyster racks provides habitat for certain fish is supported elsewhere in the literature (e.g., Pinnix et al. 2005; NAS 2009).

As stated in the "Impacts on Benthic Fauna" section above, Drakes Estero is naturally a soft-bottomed estuary with little natural hard structure. Therefore, DBOC's offshore infrastructure is a non-natural habitat type. Similar to natural habitat types, such as dense stands of kelp preferred by the kelp surfperch, the non-natural habitat provided by DBOC's offshore structures attracts prey of native structure-oriented fish species, such as amphipods and other small crustaceans. Therefore, the removal of DBOC's shellfish operation infrastructure would reduce the availability of prey for structure-oriented fish species, which would likely result in localized decreases in the abundance of these types of fish species.

Under this alternative, an increase in eelgrass habitat as a result of the removal of motorboats and oyster racks from Drakes Estero (as described in the "Impacts on Eelgrass" section of this chapter) could affect fish in Drakes Estero. Fragmentation in seagrass habitat, like that caused by motorboat propeller scars and oyster racks in Drakes Estero, has been shown to have different, and sometimes contradictory effects on fish communities (Bostrom, Jackson, and Simenstad 2006; Bostrom et al. 2011). For instance, a study comparing fish captured at the edge of propeller scars to those approximately 33 feet in adjacent seagrass beds showed a greater abundance of fish in the seagrass samples (Uhrin and Holmquest 2003). However, the same study also showed that fish abundance was the same when observed in the middle of propeller scars and at approximately 16 feet in seagrass habitat (Uhrin and Holmquest 2003). Studies on this type of spatial redistribution of fish in Drakes Estero have not been performed; however, it is likely that a spatial redistribution of fish in areas surrounding fragmented eelgrass habitat could occur. Therefore, the recolonization of eelgrass habitat after the removal of shellfish operations could lead to a subsequent restoration of the natural distribution of fish in Drakes Estero.

Changes to water quality as a result of removal of DBOC's offshore structures that could affect fish in Drakes Estero are not anticipated under alternative A. The structures are made from pressure treated wood and the two common wood preservatives used in the region (ammoniacal copper zinc arsenate and chromate copper arsenate) have the ability to leach copper into the aquatic environment. However, the majority of leaching from wood treated with ammoniacal copper zinc arsenate in saline waters occurs in the first 10 days (Brooks 1995, NOAA 2009) after contact, and leaching of copper from wood treated with chromate copper arsenate occurs in the first 90 days (Sanger and Holland 2002). As a result, the wooden structures used for oyster racks in Drakes Estero have been in contact with water for years and are not expected to continue the release of wood preservative leachates into the aquatic environment. Therefore, removal of wooden offshore structures is not anticipated to release copper leachate that would affect water quality and negatively affect fish or fish habitat.

Offshore structures are subject to deterioration and damage by weather events which may result in dispersal of items such as Styrofoam floats, treated lumber displaced from racks, and PVC piping and separators. Marine debris from damaged mariculture infrastructure has become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. Under this alternative, all racks and bags would be removed, and the fish community in Drakes Estero would benefit as the potential for mariculture debris pollution to enter the aquatic environment and affect fish would be eliminated.

The removal of offshore structures associated with the oyster racks in Drakes Estero would result in temporary localized increases in turbidity for the 2 to 3 months it would take to remove them. This would

cause highly localized and temporary disruptions to fish in the vicinity of the removal. Fish would be expected to temporarily relocate to other areas of Drakes Estero during such disruption. Further, standard sediment control BMPs would be implemented to reduce sediment erosion into neighboring wetlands or other waters. The impacts to fish and fish habitat associated with removal of rack structures under alternative A would therefore be expected to be short-term and minor.

In the long-term, the removal of motorboats and oyster racks would likely result in regrowth of eelgrass in areas currently impacted by approximately 8.5 miles of propeller scars and 7 acres of oyster racks. Natural fish habitats (eelgrass beds) would be expected to replace the structures once removed, thus increasing the presence of fish that favor this natural habitat and resulting in a localized shift in fish species composition. While the natural spatial distribution of fish in Drakes Estero would be restored under this alternative, the removal of shellfish operation infrastructure would reduce the availability of prey for structure-oriented fish species and result in localized decreases in the abundance of these types of fish species. This would allow the Drakes Estero ecosystem to return to a more natural state, with a reduced exposure to marine debris. Therefore, alternative A would result in long-term beneficial impacts due to the restoration of natural fish habitat.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact fish in the project area. These actions include restoration of the developed onshore area following SUP expiration, coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative.

Restoration of the developed onshore area following SUP expiration would include wetlands restoration practices that would improve fish habitat areas affecting approximately 5 acres. Intertidal wetlands provide potential habitat for some fish that live in Drakes Estero. These restoration efforts would result in long-term beneficial impacts on fish. Recent coastal watershed restoration efforts in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) have created or enhanced fish passage in five streams in the Drakes Estero watershed. All five streams support the federally listed steelhead and have the potential to support federally listed coho salmon. These efforts could also enhance eelgrass habitat in Drakes Estero due to improved watershed conditions. As such, watershed restoration efforts in the Drakes Estero watershed could result in long-term beneficial impacts on fish. The MLPA prohibits the take of any living marine resource in a marine protection area, except recreational clam gathering and commercial shellfish aquaculture. Alternative A, in combination with the MLPA would result in only recreational clamming allowed in Drakes Estero. Fishing, either recreationally or commercially, is prohibited under the act; therefore, the MLPA would have a noticeable beneficial impact on fish.

Based on the information above, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The beneficial impact of past, present, and reasonably foreseeable future actions, when combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on fish. Alternative A would contribute a noticeable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on fish due to the restoration of natural fish habitat, including the restoration of natural eelgrass beds that serve as essential fish habitat for a variety of Pacific groundfish identified in the Groundfish Plan (PFMC 2008). Alternative A would result in a more natural species composition and spatial distribution of fish in the project area, which would likely result in minor adverse impacts on fish due to slightly detectable decreases in the abundance of structure-oriented fish species and their prey. Alternative A would also result in short-term minor adverse impacts on fish species because the disruption of fish during rack removal from Drakes Estero would be slightly detectable and would affect only a small portion of the population and/or habitat in the project area. Combined with the removal of a source of marine debris, changes resulting from this alternative would return the Drakes Estero ecosystem to a more natural state for the overall fish community. The cumulative impact for alternative A would be beneficial and would contribute a noticeable beneficial increment to the overall cumulative impact.

Alternative A would be consistent with the guidance set forth in NPS *Management Policies 2006* for the maintenance and restoration of natural native ecosystems, including the restoration of native fish communities (NPS 2006d). Additionally, this alternative would be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because the essential fish habitat (habitat of particular concern) designated in the Pacific Fishery Management Council's Groundfish Plan would be maintained and improved.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact fish include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic

The impacts on fish associated with alternative B are, in part, related to impacts on eelgrass, which is the primary natural fish habitat in Drakes Estero. Impacts related to eelgrass are detailed in the "Impacts on Eelgrass" section of this chapter. Ninety-five wooden shellfish cultivation racks, totaling approximately 5 miles (7 acres) in Drakes Estero, displace natural eelgrass habitat. Motorboat propeller scars have damaged or displaced approximately 8.5 miles natural eelgrass habitat.

The displacement of natural eelgrass habitat caused by racks associated with DBOC shellfish operations provides non-natural habitat that attracts preferred prey species for structure-oriented fish. In a study of shellfish operations on fish populations in Drakes Estero, Wechsler (2004^{xxiii}) noted an increase in structure-oriented fish, such as kelp surfperch (*Brachyistius frenatus*). Of the 341 kelp surfperch captured during the Wechsler (2004^{xxiv}) study, only 41 individuals (approximately 12 percent of the total catch) were collected in Estero de Limantour, which is absent of shellfish operations structures. Of the 300 kelp surfperch

captured in Drakes Estero, 195 (approximately 57 percent of the total catch) were found near oyster racks in Schooner Bay and 105 (approximately 31 percent of the total catch) were found away from oyster racks (Wechsler 2004^{xxix}). Wechsler (2004^{xxv}) indicated that no significant statistical differences were observed in the abundance of all fish sampled, the number of species captured, or number of species among sites; however, the data pertaining to structure-oriented fish was not verified by a separate statistical analysis.

The study indicated the compositional differences of the fish communities using 5 similarity tests, where 4 of the 5 similarity tests showed that the fish community sampled near oyster racks was the most compositionally different from the fish community sampled in Estero de Limantour (Wechsler 2004^{xxvi}). Based on the data provided on the abundance of kelp surfperch among sites, it is likely that the results of the similarity tests described above are supported by the greater number of structure-oriented fish observed near oyster racks (Wechsler 2004^{xxvii}). The idea that oyster racks provides habitat for certain fish is also supported elsewhere in the literature (e.g., Pinnix et al. 2005; NAS 2009). Under alternative B, the continued presence of DBOC's offshore infrastructure would continue to provide non-natural structured habitat, which can be favored by a structure-oriented species, such as the kelp surfperch. In natural circumstances, kelp surfperch are normally found in structured habitats created by dense stands of kelp (*Macrocystis* spp.). Since Drakes Estero is naturally a soft-bottomed estuary with little structure, these types of structure-oriented species would normally be expected in less abundance due to a lack of suitable habitat.

The impacts to eelgrass habitat in Drakes Estero (See the "Impacts to Eelgrass" section in this chapter) could also alter the fish community as a result of habitat fragmentation. Eelgrass habitat is fragmented underneath oyster racks and in motorboat propeller scars where eelgrass is displaced or damaged. These non-natural habitat gaps can alter fish distribution in the gap itself, or over a broader area in the surrounding eelgrass; however, the response of fish to this type of fragmentation is varied and can be species-specific (Bostrom, Jackson, and Simenstad 2006, Bostrom et al. 2011). Some studies of fish in seagrass habitat damaged from single propeller scars, like those caused by DBOC boats, show that non-natural habitat gaps can create a divergence in abundance between the fish community along gap edges and in nearby seagrass beds (Uhrin and Holmquest 2003). However, due to differences in factors such as size and dispersal ability, not all fish species are affected by the non-natural habitat in the same way (Bostrom, Jackson, and Simenstad 2006) and some may be unaffected (Uhrin and Holmquest 2003). Nevertheless, based on the fish species diversity and substantial nursery function of Drakes Estero (Wechsler 2004^{xxviii}), and the extent of damage or displacement to eelgrass habitat anticipated under this alternative, literature supports the idea that the habitat fragmentation caused by DBOC motorboats and oyster racks has the potential to create a non-natural spatial redistribution of fish that could locally influence the functionality of the fish habitat.

The displacement of natural eelgrass habitat by DBOC shellfish cultivation racks also has potential impacts to essential fish habitat. As stated in above, eelgrass is designated as essential fish habitat under the Groundfish Plan (PFMC 2008). While some insight regarding local groundfish use in Schooner Bay is presented by Wechsler (2004^{xxix}), it is unclear to what degree the particular species captured in the study may rely on eelgrass beds in Drakes Estero as an essential habitat element. As described under alternative A, studies of fish assemblages conducted in multiple central California coast estuaries (Monaco, Lowery, and Emmett 1992) indicate a greater diversity of Groundfish Plan species than that shown by data collected by Wechsler in Drakes Estero. Therefore, based on available and relevant data, alternative B has the potential to adversely impact some Groundfish Plan species due to the displacement of eelgrass, which is designated as essential fish habitat.

Additionally, should a new SUP be issued, potential impacts to fish could occur as a result of repair and replacement of oyster racks. Under alternative B, DBOC would repair 50 inactive-dilapidated racks in 2013 and another 25 active racks in 2014 (DBOC 2012b^{xxx}). Some of the infrastructure on the existing racks that need repair may not need replacement. If it is assumed that only half of infrastructure of the racks in poor condition would need to be replaced, such repair would result in the following. In 2013, 65,000-97,000 linear feet of lumber would be installed in Drakes Estero in addition to 1,700-2,500 vertical 2-inch by 6-inch posts. In 2014, 14,000-29,000 linear feet of lumber would be installed in addition to 380-750 vertical 2-inch by 6-inch posts. DBOC proposes continued regular maintenance of its infrastructure following the initial wide-scale repairs (DBOC 2012b^{xxxi}). It is estimated that DBOC would repair or replace 1,000-2,000 linear feet of lumber each year, and replace vertical posts as necessary.

DBOC has not indicated whether rack repairs under alternative B would result in additional boat use in Drakes Estero. Should this occur, the additional motorized boat use in Drakes Estero could lead to further degradation of fish and fish habitat due to potential damage to eelgrass beds. Posts installed into the bottom of Drakes Estero during rack repair would disturb the underlying substrate, leading to temporary and localized sedimentation in fish habitat. Standard sediment control BMPs would be implemented to reduce sediment erosion into neighboring wetlands or other waters. Further, due to regulatory permit conditions that would likely be associated with rack repair activity, this assessment assumes that the lumber used for rack repair would require an approved coating material in order to minimize the potential for release of copper leachates into the aquatic environment. However, due to a slightly detectable disruption of fish near racks, the impacts to fish and fish habitat associated with rack repair and/or replacement under alternative B would be expected to be short-term.

The offshore shellfish operation has historically caused mariculture debris such as floats, spacers, and tubes to unintentionally become dislodged and deposited in the aquatic environment of Drakes Estero. While realizing this as an ongoing possibility, the degree and intensity to which materials could become dislodged in the future is unknown. The conditions of the SUP and the CCC CDO would require that DBOC continue to work on removal of marine debris from shellfish mariculture equipment.

Under the assumption that limited incidental mariculture debris pollution would continue under alternative B, adverse impact to fish could result from ingestion of small fragments of synthetic debris when fish are unable to distinguish the debris from normal prey (Laist 1987). Ingested debris can inhibit digestion and remain in the stomach for long periods of time, which can effect fish through a reduction in appetite, injury to the stomach lining, or provide a potential source of toxic material (Laist 1987). Smaller fish could also become entrapped in PVC spacer or tubes, causing exterior abrasion or lacerations that could be potential avenues for infection (Laist 1987). These effects from mariculture debris could adversely impact fish communities in Drakes Estero by decreasing energy or health that may make fish more susceptible to predation, disease, and reduced breeding success (Laist 1987). However, without a direct measure of debris-related mortality, it is difficult to distinguish its potential effects on fish populations from those caused by other natural or human-influenced sources of mortality (Laist 1987).

Adverse impacts to fish related to sedimentation would also be expected to result from DBOC cleanup procedures should workers disturb the soft bottom of Drakes Estero when retrieving loose debris from intertidal mudflats; however, these impacts are not expected to cause a noticeable increase in sedimentation to the ongoing impacts related to general shellfish operation activities.

Based on the impacts described above, alternative B would result in long-term minor adverse impacts on fish for an additional 10 years because impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural processes, and/or their habitat in the project area.

Upon expiration of the SUP in 2022, DBOC's removal of the shellfish racks from Drakes Estero and the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to fish in Drakes Estero. Impacts on fish associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact fish in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of past, present, and reasonably foreseeable future actions would be long-term beneficial. The beneficial impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative B would result in a long-term beneficial cumulative impact on fish. Alternative B would contribute a noticeable adverse increment to the overall beneficial cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on fish beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative B would result in long-term minor adverse impacts on fish because, as discussed above, impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural processes, and/or their habitat in the project area. While the natural species composition would remain altered due to the presence of nonnatural structured habitat, these alterations would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Additionally, eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The continued maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish identified in the Groundfish Plan (PFMC 2008). Shellfish rack repair and replacement would have the potential to degrade fish habitat by affecting water quality, but impacts would be short term due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall beneficial cumulative impact.

With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS *Management Policies 2006* to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact fish are the same as described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC's racks and bags would occupy the same space as under alternative B. The production limits associated with alternative C (500,000 pounds of shellfish per year), would be less than the 600,000 pounds per year limit associated with alternative B, however, is not expected to result in any difference in impacts to fish or essential fish habitat since there is no proposal to expand racks beyond current areas.

Under alternative C, the impact on fish would be the same as that described under alternative B. Impacts on the eelgrass, which functions as Pacific groundfish essential fish habitat are detailed in the "Impacts on Eelgrass" section of this chapter. DBOC's continued use of the 95 wooden racks, totaling approximately 5 miles (7 acres) in Drakes Estero, would continue to displace natural eelgrass habitat and would provide non-natural structured habitat that would continue to attract prey for fish species such as kelp surfperch. Eelgrass habitat fragmentation caused by 8.5 miles DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a non-natural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The wide-scale repair and replacement of shellfish racks, including repair of 50 racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{xxxii}), would result in short-term adverse impacts on water quality, fish, and fish habitat. The continued exposure to mariculture debris pollution would result in adverse impacts to fish from ingestion of small fragments or entrapment in PVC debris.

Based on the impacts described above, alternative C would result in long-term minor adverse impacts on fish for an additional 10 years because impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural processes, and/or their habitat in the project area.

Upon expiration of the SUP in 2022, DBOC's removal of the shellfish racks from Drakes Estero and the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to fish in Drakes Estero. Impacts on fish associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact fish in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include coastal watershed restoration (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of past, present, and reasonably foreseeable future actions would be long-term beneficial. The beneficial impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative C would result in a long-term beneficial cumulative impact on fish. Alternative C would contribute a noticeable adverse increment to the beneficial cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on fish beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative C would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is identified as essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative C would contribute a noticeable adverse increment to the overall beneficial cumulative impact.

With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS *Management Policies 2006* to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact fish are the same as described under alternative B. The offshore SUP boundaries associated with this alternative would be slightly larger than alternative B; however, DBOC's racks and bags would generally occupy the same cultivation beds. In addition, the production limit of 850,000 pounds of shellfish per year is not expected to result in a noticeable difference in impacts to fish or essential fish habitat because there is no proposal to expand racks beyond current areas.

The impact of alternative D on fish would be the same as described under alternative B. Impacts on the eelgrass, which functions as Pacific groundfish essential fish habitat, are detailed in the “Impacts on Eelgrass” section of this chapter. DBOC’s continued use of the 95 wooden racks, totaling approximately 5 miles (7 acres) in Drakes Estero, would continue to displace natural eelgrass habitat and would provide non-natural structured habitat that would continue to attract prey for fish species such as kelp surfperch. Eelgrass habitat fragmentation caused by 8.5 miles DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a non-natural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The wide-scale repair and replacement of shellfish racks, including repair of 50 racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{xxxiii}), would result in short-term minor adverse impacts on water quality, fish, and fish habitat. The continued exposure to mariculture debris pollution would result in adverse impacts to fish from ingestion of small fragments or entrapment in PVC debris.

Based on the impacts described above, alternative D would result in long-term minor adverse impacts on fish for an additional 10 years because impacts on fish would be slightly detectable and would only affect a small segment of the population, their natural processes, and/or their habitat in the project area.

Upon expiration of the SUP in 2022, DBOC’s removal of the shellfish racks from Drakes Estero and the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to fish in Drakes Estero. Impacts on fish associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact fish in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include coastal watershed restoration (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project) and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of past, present, and reasonably foreseeable future actions would be long-term beneficial. The beneficial impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impact of

alternative D would result in a long-term beneficial cumulative impact on fish. Alternative D would contribute a noticeable adverse increment to the overall beneficial cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on fish beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative D would result in long-term minor adverse impacts on fish because, although the natural species composition would remain altered due to the presence of nonnatural structured habitat, impacts would be relatively localized and confined to the 7 acres of racks and would not affect the overall structure of any natural community. Eelgrass habitat fragmentation caused by 8.5 miles of DBOC motorboat propeller scars and 7 acres of oyster racks would have the potential to create a nonnatural spatial redistribution of fish that could locally influence the functionality of the fish habitat. The maintenance of shellfish racks would continue to displace approximately 7 acres of eelgrass habitat, which is essential fish habitat for Pacific groundfish in the Groundfish Plan (PFMC 2008). The wide-scale repair and maintenance of shellfish racks would continue to have the potential to degrade water quality and affect the fish community, but impacts would be short term, minor, and adverse due to a slightly detectable disruption of fish near racks. Assuming that fish would have a limited exposure to commercial shellfish operation debris pollution, adverse impacts on fish from the ingestion of small fragments or entrapment in PVC debris would be slightly detectable and would affect only a small segment of the fish population or their natural processes and/or habitat in the project area. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the beneficial cumulative impact.

With regard to fish, the continued operation of DBOC for 10 additional years would not be consistent with relevant law and policy. The continued maintenance of a nonnatural community in Drakes Estero would not further the goal of NPS *Management Policies 2006* to preserve and restore natural communities and ecosystems. The perpetuation of nonnatural habitat would continue to attract fish communities that would not naturally be found in Drakes Estero. Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass, which is designated as essential fish habitat (habitat of particular concern) in the Pacific Fishery Management Council's Groundfish Management Plan, would continue.

IMPACTS ON WILDLIFE AND WILDLIFE HABITAT: HARBOR SEALS

LAWS AND POLICIES

The MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107) establishes a federal responsibility to conserve marine mammals, with management vested in NOAA under the Department of Commerce for cetaceans (whales and dolphins) and pinnipeds (such as seals). This legislation recognizes that marine mammals are resources of great international significance (aesthetic, recreational, and economic), and

should be protected and encouraged to develop, to the greatest extent feasible, with sound policies of resource management. According to the MMPA, the primary management objective for marine mammals should be to maintain the health and stability of the marine ecosystems. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the U.S. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Also, specific clauses in the MMPA protect habitat critical to life history stages such as breeding. Under the MMPA, if an activity is determined to be harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.

NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) states, “the National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.” Directives for maintaining native species include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and, minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them.” At the forefront of NPS biological resource management philosophy is the goal of preserving the genetic stock of wildlife species naturally occurring in park lands. As stated under section 4.4.1.2: “The Service will strive to protect the full range of genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity” (NPS 2006d).

METHODOLOGY

This section summarizes the impacts on Pacific harbor seals from the actions that would potentially occur under each alternative. In consideration of the populations of harbor seals found in the project area as discussed in chapter 3, impacts are evaluated in the context of the type of impact (direct, indirect), the nature of the impact (i.e., type of disturbance to wildlife and wildlife habitat), the quality and amount of harbor seal habitat impacted, and the potential for risks posed by proposed actions (e.g., introduction of nonnative species).

The impact analysis included in this section draws from a body of research originating from ongoing pinniped monitoring studies conducted by NPS as part of programs like the San Francisco Bay Area Network Inventory and Monitoring Program (e.g., NPS 2006c; Adams et al. 2009; Codde et al. 2011, 2012). The information available from this research includes data on seal counts, behavior, mortality, and potential disturbances of harbor seals in Drakes Estero and surrounding areas. NPS staff and volunteers participate in the monitoring efforts, and monitoring protocols are designed to be consistent from year-to-year to allow comparisons between years. Recognizing that some of the data provided in this program comes from volunteers and not scientists, the impact analysis in the EIS places emphasis on the data review, analysis, and interpretation of scientists in NAS (2009) and MMC (2011b). Both of these documents analyze the potential impacts of shellfish culture in Drakes Estero on harbor seals, as rendered

by experts in west coast pinniped ecology. Further, MMC (2011b) provides an in-depth review of the science and conclusions of research conducted by Becker, Press, and Allen (2009, 2011), which deals directly with shellfish culture and potential effects on the harbor seal population in Drakes Estero. Where studies on specific impacts (such as effects of sound on harbor seals) are lacking in Drakes Estero, this impact analysis draws from relevant research available in the scientific literature on those phenomena, with an emphasis on environmental settings similar to Drakes Estero. Documents considered in this review met the conditions of “primary reference” as described in Chapter 1: References Used for Impact Analysis (page 26).

Between spring 2007 and spring 2010 more than 250,000 digital photographs were taken from remotely deployed cameras overlooking harbor seal haul-out areas in Drakes Estero. These photographs are posted on the NPS web site at http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_videos.htm.

Based on public comments on the Draft EIS, the NPS initiated a third-party review of the photographs with the USGS, in consultation with a harbor seal specialist with the Hubbs-Sea World Research Institute. The USGS assessment (Lellis et al. 2012) focused on the 2008 harbor seal pupping season, when more than 165,000 photos were collected from two sites overlooking Drakes Estero between March 14, 2008 and June 23, 2008.

The USGS identified a series of limitations to the utility of the photos, including lack of study design, poor photo quality, inadequate field of view, incomplete estuary coverage, camera obstructions, and weather. Based on low image resolution and distance between the camera and the seals, the USGS noted that with the exception of seal flushing events into or towards water, it was not possible in most cases to distinguish behavior among individual seals that could be attributed to increased vigilance in response to a stimulus, (e.g., head alerts or other alert behavior). The USGS assessment identified 10 flushing disturbance events at the oyster bar (OB) site in 2008. As noted, no other level of disturbance, such as increased vigilance could be detected from the photos or videos. The USGS assessment attributed a specific stimulus to six of the ten observed flushing disturbance events. Two flushing disturbance events were attributed to boat traffic at nearby sand bars, two were attributed to kayak use of the lateral channel during the harbor seal closure period, and two were attributed to seabirds landing among the seals. As noted no other level of disturbance, such as increased vigilance could be detected from the photos or videos.

In July 2009, the MMC initiated a review of the potential effects of human activities, including aquaculture operations, on harbor seals in Drakes Estero. The study was concluded in 2011, and the results of this review are provided in MMC (2011b). The MMC pursued one primary line of inquiry into the issue of potential human effects on natural habitat in Drakes Estero: whether shellfish operations are adversely affecting harbor seals and, if so, to what extent. To accomplish this, the MMC analyzed available sources of data on the issue, including seal counts and disturbance records from NPS staff and volunteers, photographs, oyster production records, seal mortality observations, and aerial images. In addition, the MMC reviewed the validity of scientific publications that specifically address harbor seals in Drakes Estero, namely, Becker, Press, and Allen (2009, 2011). In summarizing the results of the study, MMC (2011b) describes several data gaps and recommends research and management activities to reduce the level of uncertainty surrounding this issue. With respect to sources of information derived from NPS records and research, the MMC provided the following interpretations: (1) due to the variability of seal

count data, NPS records by themselves are not sufficient to determine factors that caused changes in seal numbers; (2) statistical procedures used in NPS publications [particularly Becker, Press, and Allen (2011)] were generally appropriate but could be improved; and, (3) Becker, Press, and Allen (2011) provides "...some support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated. However, the data and analyses are not sufficient to demonstrate a causal relationship" (MMC 2011b). As a component of its review, MMC (2011b) conducted some additional statistical analyses based on recommendations from an independent statistician. This included consideration of other potential influences on seals such as environmental conditions, and the impacts of an aggressive seal at a nearby colony outside of Drakes Estero. After reviewing the results of these additional analyses, the MMC concluded that its results "...continue to support the hypothesis that oyster harvest...is at least correlated with seal use of the different haulout sites in Drakes Estero" (MMC 2011b).

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on harbor seals would be slightly detectable and would only affect a small segment of the population, natural processes, or habitat in the project area.
Moderate:	Impacts on harbor seals would result in readily apparent effects on the population, natural processes, or habitat in the project area.
Major:	Impacts on harbor seals would result in readily apparent and substantial effects on the population, natural processes, or habitat in the project area. Loss of habitat or consistent disruptions may affect the viability of the species or cause the population to relocate outside the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property.

During harbor seal pupping season all boat access is prohibited with the exception of DBOC boats. The elimination of DBOC boat traffic in Drakes Estero (approximately 12 trips per day, six days per week), especially during harbor seal pupping season (March 1 through June 30), coupled with ongoing restrictions on recreational access during the same time, would likely result in beneficial impacts on harbor seals by reducing human disturbance and displacement effects during important harbor seal reproductive periods (Suryan and Harvey 1999). Becker, Press, and Allen (2011) show harbor seal haul-out areas documented in Drakes Estero, including along the entire lateral channel in the central portion of Drakes Estero. Discontinuing operations would remove bags and boat traffic from this area, allowing for potential expansion of use areas by the seals.

In general, wildlife species can be very sensitive to sound, as animals often depend on auditory cues for hunting, predator awareness, sexual communication, defense of territory, and habitat quality assessment (Barber, Crooks, and Fristrup 2010). Negative behavioral and habitat-use consequences of higher ambient sound levels from human voices, along with sound events associated with human activities (motorists, hikers), have been observed in many species both at individual and population levels (Frid and Dill 2002; Landon et al. 2003; Habib, Bayne, and Boutin 2007). Human activities can disturb harbor seals at haul-out sites, causing changes in harbor seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011). Post mortem results from pups recovered from the mouth of Drakes Estero did not exhibit the signs of malnutrition or infection often seen in stranded seal pups, suggesting that separation was quickly followed by death and not related to infectious disease (MMC 2011b). Due to the removal of potentially disruptive activities associated with DBOC in Drakes Estero, alternative A would be expected to result in beneficial impacts on harbor seals.

Research on marine debris and its effects on wildlife indicate that marine mammals like harbor seals have been known to inadvertently consume plastic debris, which they sometimes mistake for food (Laist 1987; Williams, Ashe, and O'Hara 2011). As stated in Williams, Ashe, and O'Hara (2011), "[i]ngestion of debris may cause a physical blockage in the digestive system to the point of starvation, introduce toxic chemicals into the tissues of animals that consume it, or may cause the animal to feel satiated and reduce its foraging effort." Marine debris from damaged commercial shellfish operation infrastructure has been known to become dislodged and be found floating in Drakes Estero or washed up on mudflats and shorelines. Under this alternative, harbor seals would benefit from the removal of all racks and bags, thereby eliminating the potential for ingestion of commercial shellfish operation debris pollution.

The removal of shellfish infrastructure from Drakes Estero may require the increased use of motorboats for a period of 2-3 months outside of the harbor seal pupping season. This disturbance would continue to generate the human-caused noise that could disrupt harbor seals, but would be conducted outside of the harbor seal pupping season to minimize adverse impacts.

Under alternative A, NPS would install a gate, following standard practices, to prevent all boat-related recreational access to Drakes Estero during harbor seal pupping season (March 1- June 30 annually), including canoes and kayaks. Access to the shoreline by foot would continue. This restriction on recreational access to Drakes Estero would be expected to have beneficial impacts on harbor seals, since it would deter recreational canoeing/kayaking – activities that have been documented as a source of disturbance to harbor seals (Becker, Press, and Allen 2011; MMC 2011b). The placement of a locked gate restricting boat access to Drakes Estero during pupping season would be an effective deterrent, preventing adverse impacts on harbor seals from boat use during pupping season.

As described above, alternative A would result in long-term beneficial impacts on harbor seals because of the reduced disturbance to seals that would result from the termination of DBOC operations and associated human activities in Drakes Estero. Alternative A could also result in short-term minor adverse impacts associated with rack removal, which would be localized, slightly detectable, and would not affect the overall structure of the natural community (i.e., would only affect a small segment of the harbor seal population, natural processes, or habitat in the project area).

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact harbor seals and harbor seal habitat in the project area. These actions include kayaking, planning and management activities, and the CDFG MLPA initiative.

Nonmotorized boats, including kayaks, are known to disrupt hauled-out harbor seals (Becker, Press, and Allen 2011; MMC 2011b). As such, continued kayaking in Drakes Estero would result in minor adverse impacts on harbor seals. While harbor seal disturbances could still occur outside of the pupping season, kayaks would not be allowed into Drakes Estero during the critical pupping season.

Some limited use of motorized boats in Drakes Estero may take place for research or administrative purposes. Any motorboat use for research or administrative purposes is subject to minimum requirement and minimum tool analysis and would be infrequent. The noise generated by these boats would cause impacts on seals similar to those discussed above caused by DBOC motorboats; however, boat use in Drakes Estero would take place in compliance with mitigation measures such as maintaining a 100 yard distance from hauled out seals and not doing work during the pupping season closure. Therefore, the adverse impacts from these activities would be less than minor.

The MLPA prohibits the take of any living marine resource in the Drakes Estero Marine Conservation Area, except recreational clam gathering and commercial shellfish aquaculture. Alternative A, in combination with the MLPA, would result in only recreational clamming allowed in Drakes Estero, thus reducing potential disturbance-related impacts. Efforts associated with the MLPA have had and will continue to have a beneficial impact on harbor seals.

Based on the information above, the impact of past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on harbor seals. Alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on harbor seals due to the termination of DBOC operations and associated human activities in Drakes Estero. Disturbance to harbor seals would be limited to recreational kayakers (outside of the harbor seal pupping season), hikers on the adjacent landscape and shoreline, and aircraft. Further, the termination of shellfish operations in Drakes Estero could benefit the distribution and abundance of the native harbor seal population, and could result in expansion of available habitat for harbor seals.

Alternative A could also result in short-term minor adverse impacts associated with rack removal, which would be localized and slightly detectable but would not affect the overall structure of the natural community (i.e., would affect only a small segment of the harbor seal population, natural processes, or habitat in the project area). These activities would be conducted outside the harbor seal pupping season to minimize adverse impacts. The cumulative impact would be long term and beneficial, including the

removal of marine debris from Drakes Estero, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.

With respect to harbor seals, alternative A would be consistent with NPS policy because the removal of DBOC operations from Drakes Estero would remove an unnatural stimulus that is correlated with changes in harbor seal behavior. Similarly, the decrease in potential disturbance of this species would be consistent with MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107) by avoiding any potential take (as described above) of marine mammals and by maintaining the health and stability of the marine ecosystem.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact harbor seals include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic year-round, including during the harbor seal pupping season

DBOC operations would continue to be subject to the harbor seal protection protocol stipulated in the SUP. This protocol prohibits boat travel and general operations, including the placement of bags, moorings, and installation of floating racks in the established harbor seal protection areas (see figure 3-5). Other restrictions in the existing protocol, such as closure of the lateral channel (also shown on figure 3-5) during the harbor seal pupping season (March 1–June 30) and maintenance of a 100-yard buffer from any hauled-out harbor seal, would continue to be in effect. The removal of shellfish beds from harbor seal protection areas that would occur as a result of changes to the offshore permit boundary under this alternative would be expected to have a beneficial impact on harbor seals.

Under alternative B, the current setback requirement of 100 yards from any hauled out seal would be retained. While the NAS (2009) indicates that larger setbacks are used in Europe, this setback is based, in part, on the MMPA standard, the scale of Drakes Estero, and the ability of DBOC staff to reasonably see and recognize a hauled-out harbor seal. Specific information related to noise distribution in Drakes Estero is evaluated in the “Impacts on Soundscapes” section. DBOC employees would continue to access offshore structures in Drakes Estero throughout the year, including during the harbor seal pupping season. DBOC vessels would be required to maintain a 100-yard distance from any hauled-out harbor seals, and would be required to stay out of the harbor seal protection areas depicted on figure 3-5.

The continuation of DBOC activities would include the operation of at least two motorboats in the permit area (approximately eight hours a day, six days a week, year-round) and the continued placement and maintenance of bags on sandbars and mudflats adjacent to harbor seal protection areas. These ongoing actions are likely to have adverse impacts on harbor seals based on documented correlations between shellfish operations and harbor seal behavior in Drakes Estero (NAS 2009; Becker, Press, and Allen 2011; MMC 2011b).

Under alternative B, DBOC would repair or replace 50 inactive-dilapidated racks in 2013 and repair an additional 25 active racks in 2014 (DBOC 2012b^{xxxiv}). DBOC would be required to make repairs to the racks between July 1 and February 28 to avoid the harbor seal pupping season. DBOC has not indicated whether rack repair would result in additional boat use in Drakes Estero, although assuming rack repair would occur during regular DBOC operations, there would be potential for increased boat traffic during the 2 years of repairs (i.e., 2013-2014). Impacts on harbor seals from rack repair and/or maintenance would be expected to be short-term minor adverse due to increased boat use and human activity in Drakes Estero.

Under the assumption that limited incidental mariculture debris pollution would continue, alternative B would be expected to have adverse impacts on harbor seals due to the potential for ingestion (Laist 1987; Williams, Ashe, and O'hara 2011).

During the harbor seal pupping season (March 1 through June 30), DBOC boats are the only boats (motorized or nonmotorized) permitted in Drakes Estero. Drakes Estero is closed to all recreational boat access during this time. Under alternative B, the continuation of DBOC motorboat traffic would result in adverse impacts on harbor seals by allowing shellfish operation-related disturbances to continue during important harbor seal reproductive periods. Long-term research on shellfish operations in Drakes Estero suggests that boat traffic and other actions related to DBOC operations are negatively correlated with harbor seal use of haul out areas near shellfish cultivation sites (Becker, Press, and Allen 2011; MMC 2011b).

The adverse effects of human-induced disturbance to harbor seals have been observed in other California bays (Grigg et al. 2002), in west coast locales (Suryan and Harvey 1999; Jansen et al. 2006; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011), in the Gulf of Maine (Lelli and Harris 2001), and in Europe (Brasseur and Fedak 2003; Seuront and Prinzivalli 2005). For west coast populations, larger environmental factors such as the El Niño–Southern Oscillation events can affect harbor seal attendance and reproduction at haul-out sites (Trillmich and Ono 1991; NAS 2009). Studies in west coast estuaries suggest that motorized watercraft are a greater threat for harbor seal disturbance relative to other human activities (such as pedestrian tourists, canoeists, or kayakers) (Suryan and Harvey 1999; Calambokidis et al. 1991). Further, there may be impacts on harbor seals related to underwater sounds produced by DBOC based on previous research on other marine mammals (NAS 2003). In a recent review of the long-term data for Drakes Estero, Becker, Press, and Allen (2011) used a model-based approach to show that harbor seals preferentially use haul-out sites less when located near active oyster cultivation sites during years of high vs. low oyster harvest.

As described under “Methodology” above, a recent MMC (2011b) review of shellfish operation effects on harbor seals in Drakes Estero concluded that Becker, Press, and Allen demonstrated a negative correlation between shellfish operations and seal use of haul-out sites, but noted that this correlation did not necessarily imply causation. Further, after examining individual disturbance records, MMC (2011b) concluded that, “from time to time, shellfish operation activities have disturbed the seals. However, the data used in the analysis are not sufficient to support firm conclusions regarding the rate and significance of such disturbance” (MMC 2011b). Additionally the USGS assessment (Lellis et al. 2012) of the more than 250,000 digital photographs taken from remotely deployed cameras overlooking harbor seal haul-out areas in Drakes Estero attributed a specific stimulus to 6 of the 10 observed flushing disturbance events. Two flushing disturbance events were attributed to boat traffic at nearby sand bars, two were

attributed to a kayak using the lateral channel (note kayak was in Drakes Estero in violation of seasonal closure), and two appeared to be related to seabirds landing among the seals.

Alternative B would result in long-term moderate adverse impacts on harbor seals for another 10 years due to the seal displacement effects of human activities in Drakes Estero associated with DBOC's operation, and the potential for disturbances known to disrupt harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area.

Upon expiration of the SUP in 2022 and the removal of DBOC's commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on harbor seals in Drakes Estero. Impacts on harbor seals associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact seals in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include kayaking, planning and management activities, and the MLPA as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative B, would result in a long-term moderate adverse cumulative impact on harbor seals in the project area. Alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

Conclusion

Overall, alternative B would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained as part of the new SUP issued to DBOC, alternative B would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of marine debris into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact

would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

With respect to harbor seals, alternative B would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS *Management Policies 2006* specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact harbor seals are the same as described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, impacts would be expected to be the same as described under alternative B. DBOC’s racks and bags would occupy the same cultivation beds as under alternative B. The change in production limit (from 600,000 pounds per year under alternative B to 500,000 pounds per year under alternative C) is also not expected to result in any difference in impacts.

Impacts associated with DBOC operations and facilities under alternative C would be associated with year-round disturbance of harbor seals by DBOC operations, which have been shown to be negatively correlated with harbor seal use of haul-out sites in Drakes Estero. Further, as discussed under alternative B, repair/replacement of racks in 2013 and 2014 would result in short-term negative effects on harbor seals, and the potential for continued introduction of mariculture debris into Drakes Estero would result in negligible adverse impacts on harbor seals. These impacts would be expected to be the same those described under alternative B.

Alternative C would result in long-term moderate adverse impacts on harbor seals for another 10 years due to seal displacement effects and the potential for disturbances that are known to disrupt harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area.

Upon expiration of the SUP in 2022 and the removal of DBOC's commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on harbor seals in Drakes Estero. Impacts on harbor seals associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact seals in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include kayaking, planning and management activities, and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative C, would result in a long-term moderate adverse cumulative impact on harbor seals and harbor seal habitat in the project area. Alternative C would contribute an appreciable adverse increment to the overall cumulative impact.

Conclusion

Overall, alternative C would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative C would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the commercial shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the overall cumulative impact.

With respect to harbor seals, alternative C would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that is negatively correlated with harbor seal use of haul-out sites. NPS *Management Policies 2006* specify that NPS managers should strive to preserve and restore "behaviors of native plant and animal populations and the communities and ecosystems in which they occur" (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S.

citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wetlands are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact harbor seals include:

- Increased production limit

Under alternative D, DBOC would be permitted to produce up to 850,000 pounds of shellfish per year, which is an increase over the production limits of alternative B (600,000 pounds per year) and alternative C (500,000 pounds per year). A production limit of this magnitude would likely require an increase in boat traffic when compared to the other two action alternatives. An increase in motorboat traffic in Drakes Estero has the potential to increase disturbance to harbor seals, although the seal protection protocol mitigation measures discussed earlier would still apply.

As described above, alternative D would result in long-term moderate adverse impacts on harbor seals for another 10 years due to seal displacement effects and the potential for disturbances that are known to disrupt harbor seal behavior. These adverse impacts will be greater than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero, but are still expected to be moderate in intensity as impacts to harbor seal populations, natural processes, and/or habitat in the project area would remain readily apparent. Further, as discussed under alternative B, repair/replacement of racks in 2013 and 2014 would result in slightly detectable short-term minor adverse impacts on harbor seals, and the potential for continued introduction of commercial shellfish operation-related debris into Drakes Estero would result in negligible adverse impacts on harbor seals.

Upon expiration of the SUP in 2022 and the removal of DBOC’s commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on harbor seals in Drakes Estero. Impacts on harbor seals associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact seals in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include kayaking, planning and management activities, and the CDFG MLPA initiative as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative D, would result in a long-term moderate adverse cumulative impact on harbor seals in the project area. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative D would result in long-term moderate adverse impacts on harbor seals due to the continuation of commercial shellfish operations in Drakes Estero year-round for another 10 years, and the associated use of motorboats and bottom bag cultivation on mudflats adjacent to the designated harbor seal protection areas. This would result in continued human presence and potential disturbance of harbor seals throughout the year. Although the mandatory buffer of 100 yards from hauled-out harbor seals (year-round) and other restrictions during the harbor seal pupping season would be retained in the new SUP issued to DBOC, alternative D would result in moderate adverse impacts on harbor seals due to the potential for displacement and continued disturbances that are known to be correlated with harbor seal behavior. These impacts would be readily apparent and would affect populations, natural processes, and/or habitat of harbor seals in the project area. Impacts related to rack repair and replacement activities in 2013 and 2014 would be slightly detectable and therefore short term, minor, and adverse. The potential for the continued introduction of debris from the commercial shellfish operation into the environment would have adverse impacts on harbor seals due to the potential for ingestion. The adverse impacts associated with alternative D would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with increased production levels (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); however, these impacts are still expected to be moderate in intensity. The cumulative impact would be long term, moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.

With respect to harbor seals, alternative D would not further the goals of relevant law and policy because continued DBOC operations in Drakes Estero would maintain an unnatural stimulus that has the potential to affect harbor seal behavior. NPS *Management Policies 2006* specify that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006d). Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, “take” is defined as “harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” “Harassment” is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in

the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.

IMPACTS ON WILDLIFE AND WILDLIFE HABITAT: BIRDS

LAWS AND POLICIES

NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) states, “the National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.” Directives for maintaining native species include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and, minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them.” At the forefront of NPS biological resource management philosophy is the goal of preserving the genetic stock of wildlife species naturally occurring in park lands, as stated under section 4.4.1.2: “The Service will strive to protect the full range of genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity” (NPS 2006d).

The MBTA (16 USC 703–712, as amended) makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird ... or any part, nest, or egg of any such bird.” Under the MBTA, a “migratory bird” is any species or family of birds that live, reproduce, or migrate in or across international borders at some point during their annual life cycle.

Under the NPS Organic act, as amended and supplemented, other NPS statutes, and the NPS *Management Policies 2006*, the responsibility of the NPS to protect migratory birds and their habitat extends beyond the minimum definition of “take” in the MBTA. NPS has a commitment to regional conservation planning. NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) also states, “in addition to maintaining all native plants and animal species and their habitats inside the parks, the Service will work with other land managers to encourage the conservation of the populations and habitats of these species outside parks wherever possible. To meet its commitments for maintaining native species in parks, the Service will cooperate with states, tribal governments, the U.S. Fish and Wildlife Service, NOAA fisheries, and other countries, as appropriate to... participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d).

NPS is required by Executive Order 13186 to protect migratory birds and these responsibilities are expressed in detail in a Memorandum of Understanding (MOU) between the NPS and USFWS (NPS and

USFWS 2010). This MOU establishes how the NPS and USFWS will jointly promote the conservation of migratory birds by incorporating migratory bird conservation measures into agency actions and planning activities. In order to meet management and legal responsibilities, the MOU requires that NPS develop the capability to identify, plan for, and mitigate actions that adversely affect migratory bird population in NPS boundaries, and to work with other entities in the birds' ranges to increase awareness of migratory bird issues. The purpose of the MOU is to:

“...strengthen migratory bird conservation by identifying and implementing strategies intended to complement and support existing efforts, and facilitate new collaborative migratory bird conservation partnerships and comprehensive planning strategies for migratory birds. This includes planning efforts and activities of bird initiatives, such as the Partners in Flight American Landbird Conservation Plan, the U.S. Shorebird Conservation Plan, the North American Waterbird Conservation Plan, and the North American Waterfowl Management Plan. Planning efforts include those initiated through Joint Ventures (JVs), the North American Bird Conservation Initiative (NABCI), and the USFWS's Strategic Habitat Conservation (SHC) and the Landscape Conservation Cooperative (LCC) planning frameworks.” (NPS and USFWS 2010)

Strategies incorporated into bird conservation initiatives are based on collaborative assessments and recognition of conservation value determined by the scientific community, such as the Southern Pacific Shorebird Conservation Plan (Hickey et al. 2003) designation of the Drakes Estero and Estero de Limantour system as a Site of Regional Importance (Hickey et al. 2003) and the North American Waterbird Conservation Plan designation of the Seashore (including Drakes Estero) as an Important Bird Area (Kushlan et al. 2002).

Strategies and conservation goals are generally created based on conservation value and can be species or habitat specific. For example, the recommended habitat goal of the Southern Pacific Shorebird Conservation Plan (Hickey et al. 2003) is to increase the extent and quality of tidal flats for shorebirds. In order to increase the habitat quality of tidal flats, the plan recommends that human activities (including kayaking and oyster culture) be restricted and that further alteration of tidal flats for oyster cultivation should be prohibited (Hickey et al. 2003).

METHODOLOGY

This section summarizes the impacts on birds from the actions that would potentially occur under each alternative. Information used to complete the analysis of impacts was taken from studies of the bird population of Drakes Estero, as well as from other local and regional studies performed for birds and bird habitats that are similar to those found in the project area. Bird inventories performed by the Point Reyes Bird Observatory (White 1999) were used for data regarding waterbird and shorebird species in Drakes Estero, and to analyze the local and regional distribution of these species in other similar environments. Additional data was gathered from studies performed to ascertain the seasonal abundance of shorebirds (Shuford et al. 1989) in the Seashore and Drakes Estero. These studies reflect the abundance of data that is available regarding birds that use Drakes Estero and other coastal estuaries along the Pacific Flyway.

Analysis of the potential effect of human disturbance on waterbirds and shorebirds is also readily available; however, few studies have been performed in estuaries similar to Drakes Estero that are also influenced by the presence of shellfish mariculture. This is due to the diversity and complexity of bird populations and their habitat, the variety of types of shellfish that are grown in mariculture, and the high variability in culture methods used to grow shellfish commercially. These differences are important to recognize due to the fact that bird behavior is often species-specific and site-specific. Since many species in Drakes Estero migrate along the Pacific Flyway, additional complexity is recognized in the analysis these birds due to spatial and temporal fluctuations.

In regard to these complexities, the studies reported in Kelly et al. (1996) were particularly useful in obtaining data regarding certain shorebirds and their response to shellfish mariculture. This study was conducted in a similar, local estuarine setting (Tomales Bay) that contains oyster mariculture techniques similar to those used in Drakes Estero. Additionally, based on the bird inventories described above, many of the bird species studied in Tomales Bay are the same as those found in Drakes Estero. Due to the number and type of other bird species that use habitat in the project area, other information was needed to analyze the effects of each alternative on factors such as bird response to different types of human disturbance. In this regard, bird behavior in response to human disturbance has similarity to other environmental stimuli, therefore, a more thorough analysis of data from multiple types of environmental stimuli and human disturbance was possible.

Since the importance of shorebird and waterbird conservation is well recognized by government agencies and non-governmental organizations, additional data was used from several regional and national conservation plans. While information in these plans is not always presented on the local level with a high level of specificity, they often present detailed information regarding descriptions of individual species and populations, behavior, habitat characteristics, and birds or bird habitats that have special conservations value.

In consideration of the populations of shorebirds and waterbirds found in the project area as discussed in chapter 3, impacts are evaluated in the context of the type of impact (direct, indirect), the nature of the impact (i.e., type of disturbance to wildlife and wildlife habitat), the quality and amount of bird habitat impacted, and the potential for risks posed by proposed actions. This section evaluates both short-term and long-term direct and indirect impacts based on the following:

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on birds would be slightly detectable and would affect a small segment of the populations, their natural processes, or habitat in the project area.
Moderate:	Impacts on birds would result in readily apparent effects on populations, natural processes, or habitat in the project area.
Major:	Impacts on birds would result in readily apparent effects and would substantially influence bird populations, natural processes, or habitat in the project area. Loss of habitat or consistent disruptions may affect the viability of the species or cause populations to relocate outside the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. As described in chapter 2, DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property.

The termination of DBOC operations and removal of associated facilities and infrastructure would have beneficial impacts on the birds and bird habitat present in Drakes Estero. As described in chapter 3, Drakes Estero is a major foraging and resting location for resident and migratory birds (Shuford et al. 1989) that use the project area. The foraging and resting habitat includes intertidal beaches, intertidal flats, brackish marshland, and open subtidal waters, which attract resident and migratory bird populations due to a high abundance of available prey species and protection from predators. Abundant populations of American wigeon, bufflehead, ruddy duck, willet, western sandpiper, least sandpiper and dunlin have been recorded during mid-winter counts (White 1999). Other common species in Drakes Estero are described in chapter 3, as well as species of greater conservation concern such as the Pacific black brant and American white pelican.

DBOC bottom cultivation methods, including bags and trays, would potentially cover up to 88 acres of intertidal areas (approximately 22 acres of bags were planted in both 2009 and 2010 according to DBOC proof-of-use reports) and may prevent some birds, such as dunlin and sandpipers, from foraging for prey species that live in the underlying substrate. NAS (2009) states that by terminating bottom bag cultivation in Drakes Estero, foraging birds would no longer be prevented from accessing the sediments directly underneath bags (NAS 2009). Further, an investigation of shorebirds in Tomales Bay concluded that a significant net decrease in total shorebird use of foraging habitat resulted in tidal flats developed for oyster cultivation (Kelly et al. 1996). Based on the conclusions from the Tomales Bay study (Kelly et al. 1996), alternative A would result in beneficial impacts by improving available foraging habitat and reverting tidal flats to more natural conditions, allowing increased shorebird foraging in that habitat (see discussion under alternative B).

Bags and trays used in bottom cultivation methods may also prevent the use of intertidal areas as roosting and resting habitat for some waterbird species found in Drakes Estero, such as pelicans and cormorants (White 1999). The value of their roosting and resting habitat in Drakes Estero is accentuated by the isolation from predators and proximity to open water foraging habitat. Since they forage in water, roosting habitat also provides pelicans and cormorants an opportunity to dry out and prevent hypothermia (McChesney 2008). As a result, these waterbirds would benefit from the removal of bottom cultivation operations in this alternative due to the added availability of valuable roosting and resting habitat, as well as workers travelling by foot across intertidal areas and boats that serve as potential sources of disturbance.

Alternative A would also benefit waterbird species by allowing the protection of eelgrass beds as key bird habitats. Eelgrass beds provide important winter feeding opportunities for the Pacific black brant (Davis and Deuel 2008), as well as surface-feeding ducks and other waterfowl species. Eelgrass also supports an abundance of estuarine prey species used by many waterbird species to meet their energy requirements

(Kelly and Tappen 1998, Weathers and Kelly 2007). The removal of oyster racks (95 racks occupying approximately 5 linear miles or 7 acres) under alternative A would also allow the natural eelgrass habitat a chance to regenerate, potentially providing benefits to birds that use eelgrass bed specifically for foraging.

In particular, brant rely on eelgrass as their principle food source during migration (Davis and Deuel 2008). Brant prefer to forage in the deeper waters close to large tidal channels (Davis and Deuel 2008) where shellfish cultivation racks are commonly located. In the absence of shellfish racks, brant could expand their use of eelgrass beds and adjacent flats, which would have greater importance when populations are highest (during spring migration). Additionally, disturbances caused by motorboats accessing these racks would be removed under alternative A, providing benefits to waterbirds and waterfowl, including the brant. A coinciding benefit to spring-migrating brant under alternative A would be associated with a gate to assist NPS in enforcing the existing seasonal closure of Drakes Estero to all recreational boat access during harbor seal pupping season, which would further serve to prohibit kayaker use of the large tidal channels.

The removal of shellfish racks under alternative A also could negatively affect some bird species. The racks have potential to provide food sources and other habitat, such as roosting structures (Forrest et al. 2009). Food sources for birds may include organisms that grow on the hard substrate provided by clustered oysters or the rack apparatus, and elevated roosts provided by racks may be utilized by birds as resting habitat (Hilgerloh et al. 2001). However, the loss of benefits provided by shellfish racks under alternative A must also consider the elimination of potential negative effects of other shellfish operation activities, such as the potential for motorboats in Drakes Estero to flush birds (i.e. cause birds to abruptly fly away) from roosting structures as the boats approach the racks. The removal of the racks under alternative A would increase natural habitat for birds in Drakes Estero.

Alternative A would benefit birds by removing disturbance to normal biological behavior related to the DBOC motorboats. Greater detail on the level of this type of disturbance to birds produced from motorboats is provided in alternative B below. Similar to other unnatural human stimuli, motorized vehicles (such as motorboats) can cause disturbance to animals because the presence of the vehicle is often perceived as a predatory threat. Prey species have developed antipredator responses (e.g. avoidance, defense, etc.) to threatening stimuli, such as loud noises and rapidly approaching objects (Frid and Dill 2002). In this way, the noise stimulus from motorboats could be perceived as an auditory threat to birds, while the physical presence of motorboats could be perceived as a visual threat. While the natural ambient and background sounds in Drakes Estero are likely to occasionally disturb birds, this type of disturbance typically does not elicit the same level of response as motorboats. The removal of shellfish infrastructure from Drakes Estero could require the use of motorboats for a period of 2 to 3 months. This disturbance would temporarily continue to generate the human-caused noise that currently disrupts birds.

The effect of removal of shellfish operations and structures in the project area would also serve to restore the natural tide-dependent foraging needs of many shorebirds. In general, shorebirds must routinely move among and across feeding areas as intertidal substrates are exposed and inundated by receding or advancing tides (Kelly 2001). As a result, the shellfish operation-related loss of foraging opportunity may be heightened at particular tide levels, especially as water ascends or descends through structures that limit foraging behavior.

This alternative would also be expected to benefit birds by removing a source of pollution that can harm some bird species. Marine debris from damaged mariculture infrastructure has become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. Under this alternative, birds would benefit from the removal of all racks and bags, thereby eliminating the potential ingestion of mariculture debris pollution.

As described above, alternative A would result in long-term beneficial impacts on birds due to the reduced disturbance to normal biological behavior and improved habitat quality associated with the termination of DBOC operations and associated human activities in Drakes Estero. Alternative A may also result in short-term minor adverse impacts on birds because impacts related to rack removal would occur for 2 to 3 months but would affect a small segment of the populations, their natural processes, and habitat in the project area.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact birds and bird habitat in the project area. These actions include restoration of the developed onshore area following SUP expiration, kayaking, planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative.

Restoration of the developed onshore area following SUP expiration would restore wetlands and nearshore habitats, which are frequented by birds using Drakes Estero for activities such as foraging for food and resting. Wetland restoration would, in turn, improve bird habitat areas, affecting approximately 5 acres. Intertidal wetlands represent potential foraging habitat for some birds that live in Drakes Estero. These restoration activities would result in long-term beneficial impacts on birds and bird habitat. Recent coastal watershed restoration efforts in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) included the enhancement of habitat for organisms upon which birds feed, such as native benthic invertebrates or eelgrass. As such, these projects may have resulted in beneficial impacts on birds and bird habitat in the project area.

Nonmotorized boats, including kayaks, are known to cause birds to flush. Continued kayaking in Drakes Estero would result in minor adverse impacts on birds in eight months of every year (i.e. the time outside of the management closure of Drakes Estero from approximately June to February). Additionally, planning and management activities may authorize use of motorized boats in Drakes Estero for research or administrative purposes. The noise generated by these boats would cause impacts on birds similar to those caused by DBOC motorboats and discussed under alternative B; however, continued motorboat use is subject to minimum requirement and minimum tool analysis, would be highly infrequent, and timing and location of access could be limited. Therefore, the adverse impacts from these activities would be less than minor.

The MLPA prohibits the take of any living marine resource in a marine protection area, except recreational clam gathering and commercial shellfish aquaculture. Alternative A, in combination with the MLPA would result in only recreational clamming allowed in Drakes Estero. Since birds can feed on marine organisms, efforts associated with the MLPA have had and will continue to have a beneficial impact on birds and bird habitat.

Based on the information above, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on birds and bird habitat. Alternative A would contribute an appreciable beneficial increment to the cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on birds due to the removal of the commercial shellfish operation in Drakes Estero and its associated human activities. The removal of DBOC motorboats and related activities would minimize the disruption of biological activities such as foraging and resting for various types of birds that use Drakes Estero. Intertidal areas previously used by DBOC for the bottom bag cultivation in commercial operations would result in up to 88 additional acres of foraging, roosting, and resting habitat for resident and migratory birds. This increase in bird habitat would have greater importance for spring migrating birds, like the Pacific black brant, and natural processes would be enhanced due to the closure of Drakes Estero to all recreational boat access during the seal pupping season (March 1 – June 30). Alternative A may result in adverse impacts on birds from rack removal, due to the removal of food sources and resting habitat associated with the racks. However, these adverse impacts would be expected to be short term and minor because they would affect a small segment of bird populations, their natural processes, and habitat in the project area. Further, the removal of shellfish racks would eliminate unnatural habitat features and restore natural bird habitats in Drakes Estero. Under this alternative, birds would benefit from the removal of all racks and bags, thereby eliminating the potential for ingestion of debris from the commercial shellfish operation. Cumulative impacts would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impacts.

Alternative A would be consistent with the goals set forth in both NPS *Management Policies 2006* and the MBTA. NPS *Management Policies 2006* specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). The MBTA (16 USC 703–712, as amended) makes it illegal for people to “take” migratory birds, or their eggs, feathers, or nests. Additionally, alternative A would be consistent with Executive Order 13186 and the NPS MOU with USFWS, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions (NPS and USFWS 2010).

As described in Hickey et al. (2003) and other bird conservation plans, because of restrictions on human activity (including kayaking and shellfish operations during the March 1 – June 30 seal pupping closure) and further alteration of tidal habitat, alternative A would be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative A would also be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, the

removal of DBOC shellfish operations would be expected to positively influence birds and bird habitat by supporting conservation strategies outlined in bird conservation plans.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact birds include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic
-

While the multitude of bird species, populations, and habitats across the Seashore are well documented, data reflecting shellfish operation impacts on birds in Drakes Estero are limited. In its concluding statements on the effects of shellfish operations on birds in Drakes Estero, NAS (2009) provides the following:

“No study has been conducted to test the impacts of mariculture on birds of Drakes Estero. Drakes Estero represents an important site for overwintering and seasonally migrating shorebirds and waterfowl, with special significance as a feeding and staging site for migrating black brant geese. Boat travel by the mariculturists is likely to disturb and flush seaducks, shorebirds, and other waterbirds. Furthermore, the presence of lines of oyster bags on the intertidal flats is likely to diminish the feeding area for some probing shorebirds, while enhancing food supplies for other shorebirds willing to consume epibiotic amphipods and other invertebrates associated with algal growth on mariculture bags.”

NAS (2009) also notes that oyster bags placed on intertidal flats prevent probing shorebirds (i.e., birds with long bills used to forage on benthic fauna) from accessing benthic prey species in sediments beneath the bags. While specific studies have not been conducted to show the relationship between shellfish operations and birds in the project area, in a similar estuarine setting (Tomales Bay) near Drakes Estero, a five-year investigation of the effects of shellfish operations (including use of bottom cultivation methods) on shorebirds indicated that shellfish operations degraded shorebird habitat quality and altered foraging behaviors (Kelly et al. 1996). Similarities between Drakes Estero and Tomales Bay include the estuarine setting, shellfish cultivations methods, bird populations, and types of bird habitat.

The results of the Tomales Bay study showed that that bottom cultivation methods can alter shorebird use of tidal flat habitat by enhancing foraging opportunities for some species, like the willet (Kelly et al. 1996). However, the results also revealed decreased foraging opportunities for other species, such as the dunlin and western sandpiper (Kelly et al. 1996). When considering all species observed and their abundance, the Tomales Bay investigation concluded that a net decrease in total shorebird use of foraging habitat resulted in tidal flats developed for shellfish operations (Kelly et al. 1996).

Due to the similarities between Drakes Estero and Tomales Bay, it can be inferred that a similar effect

would occur in shorebird use of foraging habitat in tidal flats developed for shellfish operations in Drakes Estero. While NAS (2009) states that only obligate probers (i.e. birds that forage primarily by probing) are likely to experience negative effects from shellfish operations on intertidal flats in Drakes Estero (NAS 2009), studies show that probing shorebirds are some of the most dominant bird species found in Drakes Estero. This is evidenced by the winter bird counts conducted from November 1998 to March 1999 in which three of the five most abundant species recorded (dunlins, western sandpipers, and least sandpipers) were probing shorebirds (White 1999). Therefore, due to the abundance of probing shorebirds in Drakes Estero, it is likely that a net decrease in total shorebird use of foraging habitat in tidal flats used for shellfish operations also occurs in Drake Estero. Alternative B would continue these negative impacts. The mechanisms causing this net reduction could be related not only to the continued presence of shellfish operation-related structures preventing shorebird access to the substrate directly below bottom bags and other structures, but also to the reduction of shorebird use of foraging habitat adjacent to these structures (Kelly et al. 1996). In addition, the continued presence of shellfish cultivation bags and racks could obstruct visibility that shorebirds require for flock foraging behavior as well as for detecting predators (Kelly et al. 1996). Further, the availability and/or abundance of the preferred shorebird prey can be altered by shellfish operations (Trianni 1996). Physical avoidance of shellfish bags and racks as foraging substrates could also cause reduction in foraging habitat use (Kelly et al. 1996).

Under this alternative, DBOC bottom culture methods (including bags and trays) would continue to cover up to approximately 84 acres of intertidal substrate. Based on observations by Kelly et al. (1996), a reduction of foraging habitat quality and shorebird use resulting from bottom culture methods would occur in the project area under alternative B due to the continued operations of DBOC. It is likely that shorebirds would also avoid the substrate adjacent to bottom bags, further reducing habitat quality under alternative B. Further, bottom culture in intertidal areas would likely continue to limit the availability of valuable roosting and resting habitat for species such as pelicans and cormorants. Therefore, due to the abundance of probing shorebirds that would normally forage on benthic prey covered by (or in the vicinity of) shellfish culture bags, as well as the placement of bags in roosting and resting habitat of waterbirds, DBOC's use of up to 84 acres of intertidal areas for bottom bag culture would be expected to have an adverse effect on the birds and bird habitat in Drakes Estero.

Other DBOC structures that affect bird populations in Drakes Estero include shellfish racks. As described in the "Impacts on Eelgrass section," displacement of eelgrass habitat by the 95 wooden racks totals approximately 5 miles (7 acres) in Drakes Estero. While the racks offer some additional food sources and beneficial resting habitat for some species (Forrest et al. 2009), the racks are unnatural features and displacement of eelgrass reduces a food source for other species. Eelgrass beds are the main food source for the Pacific black brant (Davis and Deuel 2008), therefore, the continued presence of these racks under alternative B could have negative implications related to the distribution or population dynamics of the brant (Ganter 2000).

Under the assumption that limited incidental commercial shellfish operation-related debris pollution would continue under alternative B, adverse impact to birds could result from ingestion of small fragments of synthetic debris when birds are unable to distinguish the debris from normal prey (Laist 1987). Ingested debris can inhibit digestion and remain in the stomach for long periods of time, which can affect birds through a reduction in feeding stimuli, inhibited digestion, or by absorption of toxic material (Laist 1987; Azzarello and Van Vleet 1987). These effects from the debris pollution could adversely impact bird communities in Drakes Estero by decreasing energy or health that may make some bird

species more susceptible to predation, disease, and reduced breeding success (Laist 1987; Azzarello and Van Vleet 1987). However, without a direct measure of debris-related mortality, it is difficult to distinguish its potential effects on bird populations from those caused by other natural or human-influenced sources of mortality (Laist 1987).

Adverse impacts related to disturbance of birds in resting, roosting, and foraging habitat would also be expected to result from ongoing DBOC cleanup procedures should workers be perceived as auditory or visual threats when retrieving loose debris from intertidal mudflats; however, these impacts are not expected to cause a noticeable increase in bird disturbance in comparison to the ongoing impacts related to general shellfish operation activities.

Continued use of DBOC motorboats also has the potential to negatively affect foraging behavior of brant. When maneuvering throughout Drakes Estero to access culture beds, motorboat operators travel along routes in subtidal channels in order to reduce eelgrass impacts. Consequently, these subtidal channels have the highest frequency and duration of DBOC motorboat travel in Drakes Estero. This heightens the potential for disturbance to brant, which prefer to forage in the deepest areas permitted by tides in eelgrass beds that are close to large tidal channels (Davis and Deuel 2008). Moreover, shellfish racks located near subtidal channels overlap the brant's preferred foraging habitat, reducing their food source availability through displacement of eelgrass habitat and reducing foraging efficiency by means of increasing the potential for flushing or other motorboat-related disturbance. Disturbance caused by motorboats during foraging is related to behavioral response mechanisms such as the perception of these boats as auditory (i.e. noise) and/or visual threats. Studies have shown that disturbance from motorboats can cause some birds to stop feeding or fly away from foraging habitat (Smit and Visser 1993). Depending on the level of disturbance, brant could also experience interrupted feeding or leave the foraging location completely (Stock 1993). The latter result is reiterated by the Pacific Flyway Council (2002), which states that the brant's sensitivity to disturbance could cause immediate departure from a feeding or resting location.

This reaction to disturbance could be especially detrimental during spring-migration, when brant use Drakes Estero as a staging site. Energy expended as a result of disturbance, coupled with displacement of their primary food source, likely decreases the foraging efficiency of the brant. This can affect the energy supply required for the birds to adequately store fat for migration and breeding (Stock 1993). Because brant are not able to store enough energy reserves to allow non-stop migration from wintering to breeding grounds (Ganter 2000), they must use estuarine staging sites like Drakes Estero that have suitable eelgrass foraging habitat (Pacific Flyway Council 2002) to feed, rest, and restore depleted energy reserves. Successful staging behavior allows brant to complete migration and begin the early stages of breeding (Ganter 2000).

Flushing and other disturbance attributed to shellfish operations in Drakes Estero also affect other bird species. As stated in alternative A, NAS (2009) state that "boat travel by the mariculturists is likely to disturb and flush seaducks, shorebirds, and other waterbirds", and the presence of boats in eelgrass prevents waterbirds from congregating in that area (Kelly and Tappen 1998). DBOC motorboats make approximately 12 trips per day (amounting to approximately 1,500 trips per year) to destinations throughout the project area, although boat traffic may vary depending on factors such as demand and weather (DBOC [Lunny], pers. comm., 2011h, 2012b^{xxxv}). DBOC's motorboats are estimated to produce sound levels between 62 and 74 dBA at 50 feet. Use of boats at these levels could take between 0.2 miles (1,203 feet) and 0.8 miles (4,269 feet) for the noise to decrease to the ambient soundscape (34 dBA). Detail related to soundscapes is provided in the "Impacts on Soundscapes" section of this chapter.

The resulting disturbance to the normal biological activity of birds arises from the different levels of response (Fox and Madsen 1997), either to individual birds or to groups of birds. As stated by Fox and Madsen (1997), birds may experience minor disruptions from normal activity (e.g. walking or swimming away) or be displaced from an optimal distribution in their habitat. In a study of shorebirds in the Dutch Wadden Sea, a motor boat travelling at approximately 6m/h caused birds to walk away at a distance of approximately 300 feet, and stop feeding or fly away at approximately 150 feet (Smit and Visser 1993). This disruption results in extra energy expenditure, compounded by factors such as lost foraging or resting time and the additional energy spent in flight from disturbance (Fox and Madsen 1997). Birds may also be forced to leave optimal feeding sites and choose alternative sites that are less plentiful (Fox and Madsen 1997), and repeated flushing of waterbirds can lead to avoidance of normal foraging and resting locations (Rodgers and Schwikert 2002).

Moreover, the negative effects of continued DBOC motorboat use on birds in Drakes Estero could increase as a result of rack repair associated with the issuance of a new SUP under alternative B. Under alternative B, DBOC would repair or replace 50 inactive-dilapidated racks in 2013 and repair and additional 25 active racks in 2014 (DBOC 2012b^{xxxvi}). DBOC has not indicated whether rack repair would result in additional boat use in Drakes Estero. If additional motorboat use would be required to perform the repairs and maintenance, additional flushing and interruption of normal biological activity would be expected to negatively affect a small portion of birds in the project area, causing short-term minor adverse impacts to birds and bird habitat.

Other sounds from DBOC activity include noise produced from generators and pneumatic equipment, which concentrate in Schooner Bay and have adverse effects on foraging and resting birds nearby. Similar to the physical degradation of habitat caused by development or other human activities, the low-frequency, high-amplitude, nearly omnipresent sound produced by roads, vehicles, airports, and mechanical equipment has been found to result in a decline in species diversity, abundance, and breeding success (Rheindt 2003). Pneumatic drills and oyster tumblers are used by DBOC staff for approximately 2 hours per day near the dock. DBOC's pneumatic drills are estimated to produce sound levels between 67 and 80 dBA at 50 feet. Use of drills at these levels could take between 0.4 miles (2,071 feet) and 1.4 miles (7,537 feet) for the noise to decrease to the ambient sounds level (34 dBA). Detail related to soundscapes is provided in the "Impacts on Soundscapes" section of this chapter.

The diversity and population of many bird species can be altered in locations closer to a road or other sources of mechanized sound, which is described as the "road effect" (Francis, Ortega, and Cruz 2009). This effect is often attributed to mechanical noise levels rather than to decreased habitat quality or direct mortality caused by vehicle collisions (Reijnen et al. 1995; Rheindt 2003). Under alternative B, road effects could occur in Schooner Bay and other areas adjacent to frequent boat traffic. Bird response to road effects and disruption of normal behavior could reduce overall fitness required to successfully reach migratory breeding habitat and breed successfully upon arrival.

In areas with a high frequency of low-level noises, like the human-caused sounds in Drakes Estero associated with continued operation of DBOC, certain species can suffer more negative effects than others. Researchers have found this is due, in part, to greater differences between bird song frequency and the low-frequency sound produced by motorized vehicles. That is, birds with higher-frequency songs (like some songbirds) may have greater density near high-frequency, low-level noises than those with songs in lower frequencies (Rheindt 2003). High-frequency songs are not as strongly masked by the low-frequency

sounds and can be perceived more clearly by the receiving birds, thus increasing potential for communication. Shorebirds and waterbirds generally use less complex sounds to communicate than songbirds. When compared with songbirds, many shorebirds have a decreased range of song selection and frequency and use mainly lower-pitched calls (Douglas and Conner 1999). This may limit the ability for shorebirds to adjust their vocalizations, and increase the potential for their songs to be masked in the presence of low-frequency sounds.

Therefore, due to a potentially reduced capacity to communicate and carry out normal biological activities, the shorebirds and waterbirds in Drakes Estero with lower-frequency and/or lower-amplitude calls may be more adversely affected by sounds from DBOC motorboats and operations. These types of sounds can mask or distort the natural sounds in the environment and affect predator-prey relationships (Ortega 2012). For instance, predation risk for some birds increases in areas with high-amplitude, low-frequency mechanical sounds (Lima 2009), such as DBOC motorboats and pneumatic equipment discussed above. Risk of predation related to DBOC operations would continue under alternative B because birds would have a reduced ability to detect auditory cues made by the predators (such as a red-tailed hawk scream or the cawing of a crow), and/or the warning calls of members of their own species or other birds in the area (e.g., the warning calls of a tern due to a circling hawk). As a result, birds in Drakes Estero may experience an increase in direct mortality from predators, or choose to avoid risk-prone habitat despite other potential habitat benefits related to resting and foraging availability.

As described above, alternative B would result in long-term moderate adverse impacts on birds and bird habitat for an additional 10 years because noise disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags in Drakes Estero would result in readily apparent effects on populations, natural processes, and bird habitat in the project area.

Upon expiration of the SUP in 2022 and the removal of DBOC's commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on birds in Drakes Estero. Impacts on birds associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impacts birds and bird habitat in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include kayaking, planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative B, would result in a long-term moderate adverse cumulative impact on birds and bird habitat. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on birds and bird habitat beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Alternative B would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. As described above, the impacts of alternative B on birds would result in readily apparent effects on bird populations, natural processes, and habitat in the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be minimal because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures in Drakes Estero, would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative B would contribute an appreciable adverse increment to the overall impact.

With respect to birds, alternative B would not be consistent with the goals set forth in the NPS *Management Policies 2006*, which specifies that NPS managers should strive to preserve and restore "behaviors of native plant and animal populations and the communities and ecosystems in which they occur" and "participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks" (NPS 2006d). Alternative B would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative B would not be consistent with the NPS commitment to Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative B would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative B would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to "take" migratory birds or their eggs, feathers, or nests.

As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continuing alteration of tidal habitat, alternative B would

not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative B would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative B would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact birds would be the same as those described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC's racks and bags would occupy the same cultivation beds as under alternative B. The change in production limit (from 600,000 pounds per year under alternative B to 500,000 pounds per year under alternative C) is not expected to result in any difference in impacts between the two alternatives.

Impacts associated with DBOC operations and facilities under alternative C would be associated with disturbances of birds from continued DBOC operations in Drakes Estero and the displacement of habitat associated with the continued use of racks and bags for shellfish cultivation. Assuming that birds would have a limited exposure to mariculture debris pollution, adverse impacts to birds from ingestion of small debris fragments would be slightly detectable and would not affect the overall structure of any natural community. These impacts would be expected to be the same those described under alternative B.

Alternative C would result in long-term moderate adverse impacts on birds and bird habitat for an additional 10 years because disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags in Drakes Estero would result in readily apparent effects on bird populations, natural processes, and bird habitat in the project area.

Upon expiration of the SUP in 2022 and the removal of DBOC's commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on birds in Drakes Estero. Impacts on birds associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact birds and bird habitat in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include kayaking, planning and management activities, coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative, as described under alternative A. For the same

reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative C, would result in a long-term moderate adverse cumulative impact on birds and bird habitat. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on birds and bird habitat beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Alternative C would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and associated human activities in Drakes Estero for an additional 10 years. The impacts of alternative C on birds would result in readily apparent effects on bird populations, natural processes, and habitat in the project area. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be minor because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The cumulative impact would be long term, moderate, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

With respect to birds, alternative C would not be consistent with the goals set forth in the NPS *Management Policies 2006*, which specifies that NPS managers should strive to preserve and restore "behaviors of native plant and animal populations and the communities and ecosystems in which they occur" and "participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks" (NPS 2006d). Alternative C would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative C would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative C would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes.

Actions under alternative C would be consistent with the MBTA (16 USC 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.

As described in Hickey et al. (2003) and other bird conservation plans, because of allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative C would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative C would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative C would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, similar to alternatives B and C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wetlands are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact birds and bird habitat include:

- Production limit of 850,000 pounds of shellfish per year

The increase in production would likely lead to additional use of DBOC motorboats in Drakes Estero and an increase in the use of bottom bag culture. This potential increase in DBOC activity could result in impacts greater than those expected under alternatives B and C, although the degree of difference is unable to be determined. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts to birds from ingestion of small debris fragments would be minor because they would be slightly detectable and would only affect a small segment of the populations, their natural processes, or habitat in the project area. Additional motorboat disturbance to birds and bird habitat would likely be attributed to potential increases in noise and damage to eelgrass in Drakes Estero. Bottom bags and oyster racks used by DBOC would continue to degrade the foraging habitat for other birds. Other aspects of alternative D, including NPS operations and facilities, would be expected to have the same impacts as those described in alternative B.

As described in alternative B, alternative D would result in long-term moderate adverse impacts on birds and bird habitat for an additional 10 years because noise disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags in Drakes Estero would result in readily apparent effects on bird populations, natural processes, and bird habitat in the project area.

Upon expiration of the SUP in 2022 and the removal of DBOC’s commercial operations in Drakes Estero, the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts on birds in Drakes

Estero. Impacts on birds associated with the cessation of DBOC operations and the conversion of the site to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact birds and bird habitat in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include kayaking, planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative, as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term moderate adverse impacts of alternative D, would result in a long-term moderate adverse cumulative impact on birds and bird habitat. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on birds and bird habitat beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Alternative D would result in long-term moderate adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities in Drakes Estero for an additional 10 years. The adverse impacts could be incrementally greater under this alternative than under alternatives B and C due to the potential for increased motorboat activities. Because of Drakes Estero's importance to regional shorebird and Pacific black brant conservation, the failure to protect these species from disturbances related to shellfish operations, especially during spring migration, could result in long-term adverse impacts. Shellfish racks would remain as artificial features in Drakes Estero, and could continue to provide food sources and resting structure for some bird species. Assuming that birds would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts on birds from the ingestion of small debris fragments would be minor because the impacts would be slightly detectable and would affect only a small segment of the populations, their natural processes, or habitat in the project area. The continued use of motorboats and other noise-producing equipment, as well as the continued maintenance of shellfish growing structures, in Drakes Estero would continue to disrupt biological activities of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance. This would include additional short-term minor adverse impacts on birds associated with shellfish rack repairs outside the harbor seal pupping season in 2013 and 2014. The impacts of alternative D on birds would result in readily apparent effects on bird populations, natural processes, and habitat in the project area. The cumulative impact would be long-term moderate adverse, and alternative D would contribute an appreciable adverse increment to the overall impact.

With respect to birds, alternative D would not be consistent with the goals set forth in the NPS *Management Policies 2006*, which specifies that NPS managers should strive to preserve and restore “behaviors of native plant and animal populations and the communities and ecosystems in which they occur” and “participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks” (NPS 2006d). Alternative D would not be consistent with NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations, and to participate in regional protection. Specifically, NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant or the Southern Pacific Shorebird Conservation Plan. Alternative D would not be consistent with the NPS commitment to Executive Order 13186, which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Further, alternative D would also not be consistent with the NPS MOU with USFWS, according to which the NPS must incorporate bird conservation measures into agency actions and planning processes. Actions under alternative D are consistent with the MBTA (16 U.S.C. 703–712, as amended), which makes it illegal to “take” migratory birds or their eggs, feathers, or nests.

As described in Hickey et al. (2003) and other bird conservation plans, by allowing human activity (including kayaking and shellfish operations) and continued alteration of tidal habitat, alternative D would not be expected to support the recommended habitat goal of increasing the extent and quality of tidal flats for shorebirds (Hickey et al. 2003). Alternative D would not be expected to support the primary regional conservation goal of the U.S. Shorebird Conservation Plan to maintain the quality and quantity of habitat at local levels in order to support birds that breed, winter in, and migrate through each region (Brown et al. 2001). As such, DBOC shellfish operations under alternative D would be expected to adversely affect birds and bird habitat by not adhering to conservation strategies outlined in bird conservation plans.

IMPACTS ON SPECIAL-STATUS SPECIES

LAWS AND POLICIES

The ESA mandates all federal agencies to consider the potential impacts of their actions on listed threatened or endangered species to protect the species and preserve their habitats. Specifically, section 7 of the ESA states that federal agencies must use their authority to conserve listed species and ensure that their actions do not jeopardize the continued existence of the listed species. In addition, section 6 of the ESA encourages each state to develop and maintain conservation programs for resident federally listed threatened and endangered species. The California Endangered Species Act fulfills section 6 of the federal ESA, and generally parallels the main provisions of the ESA. The USFWS and NMFS share responsibility for implementing the ESA, while CDFG administers the California Endangered Species Act in cooperation with the federal ESA authorities.

NPS *Management Policies 2006*, which currently sets the policy framework for NPS management of federally threatened and endangered species, states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). If the NPS determines that an action may adversely impact a federally listed species,

consultation with USFWS and/or NMFS would be completed prior to the release of the ROD to ensure that the action would not jeopardize the species' continued existence or result in destruction or adverse modification of critical habitat.

METHODOLOGY

The USFWS was contacted to obtain a list of threatened and endangered species and designated critical habitats that may occur in the project area. Information on possible threatened or endangered species, candidate species, and species of special concern was also gathered by NPS from past studies and plans. NPS determined that none of the federally listed plant species in the USFWS results have potential to be affected by the proposed actions in the project area. Further, NPS determined that seven of the federally listed animal species have potential to exist in the project area. As described in chapter 1, five of the federally listed animal species were dismissed from further analysis in the EIS due to a lack of designated critical habitat in the project/action area, unconfirmed presence of the species in the project/action area, or the potential for less than minor impacts on the species and/or their critical habitat. These include Myrtle's silverspot butterfly, California red-legged frog, leatherback sea turtle, western snowy plover, and California least tern. As such, this section summarizes the impacts on two federally listed animal species or their designated critical habitat from the actions that would potentially occur under each alternative. These species include central California Coho salmon and central California steelhead. In the case that animal species are not known to use the designated critical habitat in the project area, the discussion is focused on potential impacts on that habitat (not the animal).

Information used to complete the impact analysis was gathered from multiple sources, including NMFS and USFWS consultations on record for previous Seashore projects (NMFS 2006, 2009, 2011g; USFWS 2004, 2008), scientific literature pertaining to the central California Coho salmon and steelhead, and from federal documents pertaining to ESA protection for each species. No studies of central California Coho salmon and central California steelhead have been conducted in Drakes Estero; however, studies in the region in similar settings and government agency management plans provided suitable background information for the analysis of impacts.

Some information used for analysis in this section is described in federal documents pertaining to ESA protection of Coho salmon and steelhead. These documents include notices published in the U.S. Federal Register such as final rules and executive orders. They also include recovery plans required by the ESA, which are guidance documents intended to delineate reasonable actions that are believed to be required to recover and/or protect listed species. As such, according to the ESA, the recovery plans must at a minimum provide a description of site-specific management actions necessary to achieve recovery of a species; objective, measurable criteria which, once met, would result in a determination that the species be removed from the list; and estimates of the time and cost required to achieve the plan's goal (NMFS 2010d). A 5-year review is also required to evaluate whether or not a species status has changed since it was listed or since the last 5-year review.

NMFS recovery planning follows NMFS interim recovery planning guidance, which was established in July 2006. This guidance, in addition to status reviews conducted by NMFS, has led to several recent recovery documents for salmon and steelhead species in multiple regions. Recovery of the central California coast Coho salmon is outlined in the draft central California coast Coho salmon recovery plan

(NMFS 2010b), which is in the approval process. Recovery of the central California coast Steelhead is described in the *Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead* (NMFS 2011e). This is a NMFS pre-planning document to facilitate development of a draft recovery plan. The detailed information on central California coast Coho salmon critical habitat and the central California coast steelhead presented in these documents was used in the impact analysis for this section. In order to meet ESA requirements, site-specific and species-specific information presented in recovery documents is based on the most recent and relative research from the scientific community.

In consideration of the federally listed animal species or their designated critical habitat discussed in chapter 3, impacts these federally protected resources are evaluated in the context of the type of impact (direct or indirect), the nature of the impact (i.e., type of disturbance), and the quality and quantity of habitat impacted. This section evaluates both short-term and long-term direct and indirect impacts based on the following:

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on federally listed individuals or populations would be slightly detectable in the project area. Impacts on critical habitat would be slightly detectable and localized (affecting a small portion of the designated critical habitat in the project area).
Moderate:	Impacts on federally listed individuals or populations would be readily apparent in the project area. Impacts on designated critical habitat in the project area would be readily apparent.
Major:	Impacts on federally listed individuals or populations would be readily apparent, widespread, and may result in the loss of the federally listed species. Impacts on designated critical habitat would be readily apparent and widespread and may result in the loss of designated critical habitat.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations would expire on November 30, 2012. As described in chapter 2, DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property. Based on information provided in chapter 3, impacts of alternative A on the federally listed Central California coho salmon critical habitat and Central California steelhead are discussed below.

Central California Coho Salmon Critical Habitat. As an anadromous fish species, Coho salmon migrate from spawning habitat in freshwater streams to ocean habitats, traveling through (and feeding in) estuaries during their migration (CDFG 2004c). Typically, juveniles use estuaries as rearing and nursery habitat, while adults use estuaries as a holding area used to prepare for migration upstream (CDFG 2004c). While Coho salmon are not currently found in the Drakes Estero watershed, recovery potential related to

repopulation is possible in Drakes Estero due to the presence of various critical habitat requirements, such as space for individuals and population growth, nutritional and physiological requirements, cover and shelter from predators, and rearing habitat for offspring, among others (NOAA 1999). Further, nomadic juvenile Coho salmon (i.e. those that stray from their natal habitat) from nearby populations could swim into the Drakes Estero to seek rearing or refuge habitat (Koski 2009, Roni et al. 2012).

Disturbance from mariculture operations in Drakes Estero can affect the critical habitat requirements for Coho salmon. For example, damage to eelgrass beds from motorboat propellers and oyster racks can adversely impact eelgrass habitat (see the “Impacts on Wildlife and Wildlife Habitat: Fish” section of this chapter), which in turn alters the natural role of eelgrass as refuge and rearing habitat for Coho salmon. In addition, offshore structures are subject to deterioration and damage by weather events, and debris from damaged mariculture infrastructure can become dislodged and degrade Coho salmon habitat. Therefore, alternative A would improve the quality of Coho salmon critical habitat requirements by eliminating disturbance from mariculture operations in Drakes Estero.

Removal of racks during DBOC closeout procedures would remove lumber treated with wood preservatives from Drakes Estero. However, the wooden structures in Drakes Estero have been in contact with water for years and are not expected to continue the release of copper leachates into the aquatic environment. Therefore, the removal of treated lumber under alternative A would eliminate artificial shellfish structures from Drakes Estero and improve critical habitat for the central California Coho salmon by returning eelgrass habitat to more natural conditions. The removal of treated lumber is not anticipated to negatively affect water quality in the critical habitat through the release of wood preservative leachates.

As mentioned in the discussion of impacts on eelgrass, removal of the racks from in Drakes Estero during DBOC closeout procedures could cause temporary adverse impacts to eelgrass due to disturbance of the Drakes Estero bottom during removal of approximately 4,700 posts, which currently support DBOC’s 5 linear miles of racks, but would improve the overall quality of eelgrass habitat. Rack removal would be conducted using standard BMPs to minimize sediment disturbance.

Overall, Alternative A would result in long-term beneficial impact on central California Coho salmon critical habitat as a result of improving designated critical habitat.

Central California Steelhead. Similar to Coho salmon, the central California steelhead is an anadromous fish species that migrates between freshwater spawning habitat and ocean habitat. Unlike the Coho salmon, steelhead are known to occur in the Drakes Estero watershed, and passage through Drakes Estero may occur periodically. During migration, estuaries are used by the steelhead as feeding habitat due to essential habitat elements. For instance, eelgrass beds provide complex habitat elements in the estuarine food web and provide steelhead with feeding opportunities and shelter from predators (PFMC 2003). Destruction of eelgrass in Drakes Estero from human activity, like motorboat travel, reduces eelgrass habitat functions provided to the steelhead, such as refuge from predation.

The role of Drakes Estero as nursery habitat for fish to feed, spawn, and avoid predators (Wechsler 2004^{xxxviii}) is also an important aspect that likely benefits the central California steelhead. Studies have shown that estuaries are essential to juvenile steelhead by providing valuable rearing and nursery habitat (Bond 2006). Steelhead do not spawn in estuaries, but juveniles rely on estuary habitat to forage and

avoid predators so that they can mature and complete their anadromous life cycle (Bond 2006). Studies from similar estuaries to Drakes Estero suggest that eelgrass may not be a requisite habitat element for rearing steelhead, and that steelhead prey are not unique to eelgrass. The diet of juvenile steelhead that are reared in similar settings to Drakes Estero can include fairly common prey species such as amphipods and isopods (Bond 2006). While some steelhead prey species are found in eelgrass beds, they also utilize other habitat like those found in unvegetated estuarine environments.

Under this alternative, the restoration of natural eelgrass habitat by eliminating motorboat travel and oyster racks from Drakes Estero (see the “Impacts on Eelgrass” section for additional detail) would be expected to improve the quality of rearing and nursery habitat for central California steelhead. The effect of commercial shellfish operations on eelgrass habitat, such as fragmentation of the habitat from propeller scars, can cause non-natural spatial redistribution of steelhead prey species (Bostrom, Jackson, and Simenstad 2006). Because this redistribution of prey species could also affect the natural foraging habits of steelhead, this alternative would be expected to restore natural foraging behavior and habitat of steelhead by restoring the natural distribution of their prey in eelgrass habitat.

The removal of shellfish racks used in the commercial shellfish operations in Drakes Estero could also benefit central California steelhead. Studies have shown that shading, changes in wave energy, and substrate alteration caused by overwater structures can affect juvenile steelhead during migration through estuaries (Nightengale and Simenstad 2001). The effect on steelhead is related to the changes the overwater structure cause to prey species distribution. For instance, the distribution of invertebrates under overwater structures has been found to be different than that found in adjacent non-shaded vegetated habitats (Nightengale and Simenstad 2001). Therefore, due to the removal of shellfish racks this alternative would be expected to restore the natural distribution of steelhead prey in Drakes Estero, which would be expected to further restore the natural foraging behavior and habitat of central California steelhead.

As discussed the “Impacts to Eelgrass” section of this chapter, removal of the racks from in Drakes Estero during DBOC closeout procedures could result in temporary adverse impacts to eelgrass, but would improve the overall quality of eelgrass habitat. Rack removal would be conducted using standard BMPs to minimize disturbances, and would remove lumber treated with wood preservatives from Drakes Estero. However, the wooden structures in Drakes Estero have been in contact with water for years and are not expected to continue the release of copper leachates into the aquatic environment. Therefore, the removal of treated lumber under alternative A would eliminate artificial shellfish structures from Drakes Estero and improve habitat for the central California steelhead by returning eelgrass habitat to more natural conditions. The removal of treated lumber is not anticipated to negatively affect water quality through the release of wood preservative leachates in the steelhead habitat.

Offshore structures are subject to deterioration and damage by weather events which may result in dispersal of items such as Styrofoam floats, treated lumber displaced from racks, and PVC piping and separators. Marine debris from damaged mariculture infrastructure has become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. Under this alternative, all racks and bags would be removed, and central California steelhead habitat in Drakes Estero would be enhanced by eliminating the potential for mariculture debris pollution in the aquatic environment.

Alternative A would result in long-term beneficial impacts to central California steelhead by eliminating impacts on eelgrass caused by DBOC boats, reducing exposure to mariculture debris pollution, and returning eelgrass habitat to a more natural condition by removing artificial shellfish structures. Alternative A could result in short-term adverse impacts on the central California steelhead because of localized sedimentation in habitat during close out procedures would be slightly detectable for a period of 2 to 3 months.

Overall, alternative A would result in long-term beneficial impacts on central California Coho salmon critical habitat and the central California steelhead in the project area. Alternative A could also result in short-term minor adverse impacts to these protected resources during removal of DBOC facilities and personal property because removal could disturb individuals or cause temporary sedimentation in designated critical habitat. However, the short-term impacts related to removal would be highly localized and would last 2 to 3 months.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact central California Coho salmon critical habitat and the central California steelhead in the project area. These actions include planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative. Recent coastal watershed restoration efforts in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) included the enhancement of habitat for Coho salmon and California steelhead to improve potential fish passage. These efforts could result in long-term beneficial impacts on central California Coho salmon critical habitat and central California steelhead by improving fish migration opportunities in the project area and the larger watershed.

The MLPA prohibits the take of any living marine resource in a marine protection area, except recreational clam gathering and commercial shellfish aquaculture. Since federally listed fish can feed on marine organisms, efforts associated with the MLPA have had and would continue to have a long-term beneficial impact on central California Coho salmon critical habitat and the central California steelhead.

Based on the information above and despite some cumulative adverse impacts, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of past, present, and reasonably foreseeable future actions, when combined with long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact on central California Coho salmon critical habitat and the central California steelhead. Alternative A would contribute a noticeable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative A would result in a long-term beneficial impact on central California Coho salmon critical habitat and the central California steelhead. Alternative A could also result in short-term minor adverse impacts on these federally protected resources during the removal of DBOC facilities and personal property because these activities could disturb individuals or cause temporary sedimentation in designated critical habitat. The short-term impacts related to removal would be highly localized and

would last for a period of two to three months. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the overall cumulative impact.

For central California Coho salmon critical habitat and the central California steelhead, alternative A would be consistent with relevant law and policy. Alternative A would forward the goal set forth in NPS *Management Policies 2006*, which states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). Alternative A would also fulfill the federal mandate set forth by the ESA to conserve listed species and to ensure that the proposed actions do not jeopardize the continued existence of the listed species.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact central California Coho salmon critical habitat or the central California steelhead include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic

Central California Coho Salmon Critical Habitat. The Coho salmon critical habitat designation considers the following requirements of the species: (1) Space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) Cover or shelter; (4) Sites for breeding, reproduction, and rearing of offspring; and (5) Habitats that are protected from disturbance or are representative of the historic geographical and ecological distribution of a species (NOAA 1999). The diverse estuarine habitats in Drakes Estero provide many of these critical habitat requirements for Coho Salmon, such as space for individual and population growth, nutritional and physiological requirements, cover from predators, and sites for rearing of offspring. The quality of some critical habitat requirements could potentially be affected by this alternative, including food or nutritional requirements, cover from predators, and site for rearing of offspring.

The displacement of eelgrass from propeller scars and oyster racks (see “Impacts to Eelgrass” section of this chapter) would be expected to cause adverse impacts to Coho salmon critical habitat by reducing the quality of some critical habitat requirements. Eelgrass beds serve as habitat for Coho salmon prey species and provide cover for predator avoidance (PFMC 2003). In studies of estuarine habitats where Coho salmon are normally present, the salmon have been captured in relatively high abundances in samples taken from eelgrass habitat (Harris et al. 2008). As described in the “Impacts to Wildlife and Wildlife Habitat: Fish” section of this chapter, impacts to eelgrass from DBOC shellfish operations can create localized non-natural fish distributions that affect the functionality of fish habitat. Changes in fish distributions could affect the natural predator-prey relationships pertaining to Coho salmon by altering their prey availability and/or predator abundance. Therefore, impacts to eelgrass habitat could create local adverse impacts to Coho salmon critical habitat by altering food and cover requirements.

While Coho salmon are not currently present in Drakes Estero, the protection of their designated critical habitat provides greater potential for salmon to repopulate Drakes Estero. As stated above, critical habitat requires sites for rearing of offspring (NOAA 1999). Drakes Estero provides potential habitat for the rearing of offspring because nomadic juvenile Coho salmon can use estuaries adjacent to their natal waters for additional rearing habitat (Koski 2009; Roni et al. 2012). Therefore, the known Coho salmon populations from adjacent watersheds in Marin County and Sonoma County (King 2004) could provide a source of nomadic juvenile Coho which could potentially occupy Drakes Estero. Impacts to eelgrass habitat could also adversely impact Coho salmon critical habitat by altering sites for rearing of offspring. However, impacts would be localized because Drakes Estero has other habitat types that could be used for rearing of offspring.

Under the assumption that limited incidental mariculture debris pollution would continue under alternative B, adverse impact to Coho salmon critical habitat could result from the presence of small fragments of synthetic debris in Drakes Estero. While Coho salmon do not currently reside in Drakes Estero, the presence of synthetic debris could impact critical habitat by altering their food source. If nomadic juvenile Coho were to enter Drakes Estero, debris could be mistaken as food and could alter their digestion, injure the stomach, or provide of a potential source of toxic material (Laist 1987). Therefore, mariculture debris pollution could adversely impact Coho salmon critical habitat by altering food requirements.

As described in DBOC's November 2010 submittal to NPS, 50 racks in Drakes Estero are categorized by DBOC as "Needs repair Inactive." Should a new SUP be issued, DBOC's June 5, 2012 request is to repair plans to repair 50 of the racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{xxxviii}). It is assumed that the 50 racks in 2013 represent the 50 racks categorized in 2010 as "Needs repair inactive". The 50 racks to be replaced in 2013 represent a total length of approximately 13,608 feet covering 3.75 acres. Assuming that 50 to 75 percent of the materials in the existing racks need to be replaced, the 2013 repairs would require installation of between 65,000 and 97,000 linear feet of lumber. It is anticipated that between 1,700 and 2,500 vertical 2-inch by 6-inch posts would be installed into the bottom of Drakes Estero.

In 2014, 25 racks would be repaired or replaced. This represents approximately half of the total racks classified as "Good Order and Condition Active" according to DBOC's 2010 submittal to NPS, referenced above. It is anticipated that the total length of racks treated in 2014 would be approximately 6,030 feet (1.66 acres). Based on the good order and condition, it is anticipated that between 25 percent and 50 percent of the materials would need to be replaced. The 2014 repairs would require installation of between 14,000 and 29,000 linear feet of lumber and between 380 and 750 vertical 2-inch by 6-inch posts.

DBOC has not indicated whether the rack repairs proposed under alternative B would result in additional boat use in Drakes Estero. Posts installed during rack repair into the bottom of Drakes Estero would disturb the underlying substrate, leading to localized sedimentation in critical habitat. Standard sediment control BMPs would be implemented to reduce sediment erosion into neighboring wetlands or other waters, thereby reducing potential water quality impacts that could adversely affect Coho salmon critical habitat requirements. The posts and other treated wood could adversely impact water quality, resulting from the release of copper leachates from pressure treated lumber. Since the olfactory sensory capability of Coho salmon can be damaged when copper concentrations rise by 0.79 ug/L above ambient conditions (NOAA 2009), alternative B has additional potential to negatively affect water quality and Coho salmon critical habitat. However, based on regulatory permit conditions that would likely be associated with rack

repair activity, this assessment assumes that lumber used for rack repair would require an approved coating material in order to minimize the potential for release of copper leachates from treated wood into aquatic environments.

As a result, due localized sedimentation for a period of 2 to 3 months, the impacts to water quality in Coho salmon critical habitat associated with rack repair and/or replacement under alternative B would be slightly detectable in the project area. Adverse impacts related to localized sedimentation would also be expected to result from DBOC cleanup procedures should workers disturb the soft bottom of Drakes Estero when retrieving loose debris from intertidal mudflats; however, these impacts are not expected to cause a noticeable increase in sedimentation to the ongoing impacts related to general shellfish operation activities.

Therefore, alternative B would result in long-term minor impacts on central California Coho salmon designated critical habitat for an additional 10 years because continued damage to eelgrass and water quality would be slightly detectable and localized, and could degrade a relatively small proportion of designated critical habitat requirements in the project area.

Central California Steelhead. Estuaries provide habitat for adult steelhead migrating upstream and for juvenile steelhead migrating downstream for feeding, transition to saltwater, and refuge (CDFG 1996). While Drakes Estero is not part of the steelhead's designated critical habitat area, the role Drakes Estero provides as nursery habitat for fish to feed, spawn, and avoid predators (Wechsler 2004^{xxxix}) is also an important aspect that likely benefits the central California steelhead. Estuaries like Drakes Estero are essential to juvenile steelhead and provide valuable rearing and nursery habitat, allowing juveniles to forage and avoid predators so that they can mature and complete their anadromous life cycle (Bond 2006).

Under this alternative, the displacement and damage to eelgrass habitat from DBOC motorboat propeller scars and oyster racks (see the "Impacts on Eelgrass" section for additional detail) would be expected to affect the quality of rearing and nursery habitat for central California steelhead. Fragmentation of the habitat from propeller scars can cause non-natural spatial redistribution of steelhead prey species (Bostrom, Jackson, and Simenstad 2006). Therefore, this alternative could have localized adverse impacts on steelhead foraging success by altering the natural distribution of their prey in eelgrass habitat. However, studies show that eelgrass may not be a requisite habitat element for rearing steelhead, and that the diet of juvenile steelhead can include fairly common prey species such as amphipods and isopods (Bond 2006). While some steelhead prey species are found in eelgrass beds, they also utilize other habitat like those found in unvegetated estuarine environments.

The continued use of racks for commercial shellfish operations in Drakes Estero could also affect central California steelhead. Overwater structures can create non-natural light infiltration from shading, and cause changes in wave energy and bottom substrates that can affect juvenile steelhead behavior during migration through estuaries (Nightengale and Simenstad 2001). The effect on steelhead is related to the changes the overwater structure cause to prey species distribution. For instance, the distribution of invertebrates under overwater structures has been found to be different than that found in adjacent non-shaded vegetated habitats (Nightengale and Simenstad 2001). Therefore, due to the potential effects of shellfish racks in Drakes Estero as overwater structures, this alternative would be expected to create a non-natural distribution of steelhead prey near the racks, which would be expected to have localized adverse impacts on the natural foraging behavior and habitat of central California steelhead.

The impacts of installing additional racks using pressure treated lumber to the central California steelhead would be expected to be similar to those described for Coho salmon. Posts installed during rack repair into the bottom of Drakes Estero would disturb the underlying substrate, leading to localized sedimentation in critical habitat. However, standard sediment control BMPs would be implemented to reduce sediment erosion into neighboring wetlands or other waters.

The posts and other treated wood could adversely impact water quality, resulting from the release of copper leachates from pressure treated lumber. Similar to the Coho salmon, olfactory sensory capability of steelhead can be damaged when copper concentrations rise by 0.79 ug/L above ambient conditions (NOAA 2009). However, based on regulatory permit conditions that would likely be associated with rack repair activity, this assessment assumes that lumber used for rack repair would require an approved coating material in order to minimize the potential for release of copper leachates from treated wood into aquatic environments with salmonid habitat. As a result, due localized sedimentation for a period of 2 to 3 months, the impacts to central California steelhead associated with rack repair and/or replacement under alternative B would be slightly detectable in the project area and therefore be expected to be short-term and minor.

Under the assumption that limited incidental mariculture debris pollution would continue under alternative B, direct adverse impact to central California steelhead could result from the presence of small fragments of synthetic debris in Drakes Estero. This could occur through the ingestion of debris by steelhead, which could inhibit their digestion and remain in the stomach for long periods of time. This could affect the steelhead through a reduction in appetite, injury to the stomach, or by provision of a potential source of toxic material (Laist 1987). These effects from mariculture debris could adversely impact central California steelhead by decreasing energy or health that may make the fish more susceptible to predation, disease, and reduced breeding success (Laist 1987).

Adverse impacts to central California steelhead related to sedimentation would also be expected to result from DBOC cleanup procedures should workers disturb the soft bottom of Drakes Estero when retrieving loose debris from intertidal mudflats; however, these impacts are not expected to cause a noticeable increase in sedimentation to the ongoing impacts related to general shellfish operation activities.

Therefore, alternative B would result in long-term minor impacts on central California steelhead for an additional 10 years because ongoing direct and indirect impacts to a relatively small portion of steelhead and steelhead habitat would be slightly detectable and localized.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact central California Coho salmon critical habitat and central California steelhead in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP planning and management activities, coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative B would result in a long-term beneficial cumulative impact on central California Coho salmon

critical habitat and the central California steelhead. Alternative B would contribute a noticeable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on central California Coho salmon critical habitat and the central California steelhead beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative B would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt a small proportion of the individuals and/or designated critical habitat in the project area. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and slightly detectable adverse impacts on Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative B would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a few months each year (outside of the seal pupping season) that would cause slightly detectable impacts to federally listed individuals or populations and critical habitat in the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and beneficial, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.

For central California Coho salmon critical habitat and the central California steelhead, alternative B would be consistent with relevant law and policy. However, alternative B would not fulfill the goals articulated in *NPS Management Policies 2006* as well as alternative A would. *NPS Management Policies 2006* states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact central California Coho salmon critical habitat and the central California steelhead are the same as described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC's racks and bags would occupy the same space as under alternative B. The change in production limit (from 600,000 pounds per year under alternative B to 500,000 pounds per year under alternative C) is also not expected to result in any difference in impacts.

Under this alternative, damage to eelgrass habitat and reduction in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements. The displacement of eelgrass from propeller scars and oyster racks, as well as the non-natural changes to habitat condition from oyster racks, could cause a non-natural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Assuming that Drakes Estero would have a limited exposure to mariculture debris pollution, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from mariculture debris would not affect the overall structure of any natural community.

Therefore, alternative C would result in long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years due to the continued operation of a commercial shellfish operation in Drakes Estero. Impacts on these federally listed species would be slightly detectable and impacts on the designated critical habitat in the project area would be slightly detectable and localized.

Upon expiration of the SUP in 2022, DBOC's operations would cease and the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes to central California Coho salmon critical habitat and the central California steelhead. Impacts on these federally protected resources associated with conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact central California Coho salmon critical habitat and the central California steelhead in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include planning and management activities, coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of past, present, and

reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative C, would result in a long-term beneficial cumulative impact on central California Coho salmon critical habitat and the central California steelhead. Alternative C would contribute a noticeable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on central California Coho salmon critical habitat and the central California steelhead beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative C would result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized, and could disrupt individuals and/or designated critical habitat in the project area. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative C would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks in 2013 and 2014 could cause localized sedimentation for a period of two to three months per year that would be slightly detectable in the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation-related debris pollution is limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. Cumulative impacts would be long term and beneficial, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.

For central California Coho salmon critical habitat and the central California steelhead, alternative C would be consistent with relevant law and policy. However, alternative C would not fulfill the goals articulated in *NPS Management Policies 2006* as well as alternative A would. *NPS Management Policies 2006* states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact central California Coho salmon critical habitat and the central California steelhead are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact these federally protected resources include:

- Increased production limit
- New onshore development
- Increased visitation to DBOC

Under alternative D, DBOC could produce up to 850,000 pounds of shellfish. This is an increase over the production limits under alternative B (600,000 pounds per year) and alternative C (500,000 pounds per year). The increase in shellfish production levels could result in an increase in DBOC offshore operations, including the presence/use of additional racks, bags, and other materials associated with commercial shellfish operations in the 138 acres of delineated culture beds. Increased operations could also cause expanded motorboat use/traffic.

As a result, adverse impacts associated with alternative D would likely be slightly greater than those described for alternatives B and C. Damage to eelgrass habitat and changes in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements, such as food and cover requirements. The displacement of eelgrass from propeller scars and oyster racks, as well as the non-natural changes to habitat condition from oyster racks, could cause a non-natural redistribution of steelhead prey species that would be expected to have slightly detectable and localized adverse impacts on the natural foraging behavior and habitat of central California steelhead. Assuming that Drakes Estero would have a limited exposure to commercial shellfish operation-related debris pollution, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from this debris would not affect the overall structure of any natural community. However, although impacts on the offshore resources in Drakes Estero may be greater under this alternative than under the other alternatives, the increased production is expected to result in continued long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead.

Therefore, alternative D would result in long-term minor adverse impacts on central California Coho salmon critical habitat and the central California steelhead for an additional 10 years due to the continued operation of a commercial shellfish operation in Drakes Estero. Impacts on these federally listed species would be slightly detectable and impacts on the designated critical habitat in the project area would be slightly detectable and localized.

Upon expiration of the SUP in 2022, DBOC's operations would cease and the NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes to central California Coho salmon critical habitat and the central

California steelhead. Impacts on these federally protected resources associated with conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness in 2022 would be similar to those discussed under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact central California Coho salmon critical habitat and the central California steelhead in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include planning and management activities, coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative D, would result in a long-term beneficial cumulative impact on central California Coho salmon critical habitat and the central California steelhead. Alternative D would contribute a noticeable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on central California Coho salmon critical habitat and the central California steelhead beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative D would result in long-term minor adverse impacts on designated central California Coho salmon critical habitat and the central California steelhead for an additional 10 years because impacts from ongoing DBOC operations would be slightly detectable and localized (affecting a small proportion of the designated Coho salmon critical habitat and steelhead in the project area). Damage to eelgrass habitat and reduction in water quality have the potential to cause localized and slightly detectable adverse impacts to Coho salmon critical habitat by reducing the quality of some required habitat elements. The displacement of eelgrass from propeller scars and oyster racks, as well as the nonnatural changes to habitat condition from oyster racks, could cause a nonnatural redistribution of steelhead prey species that would be expected to have slightly detectable adverse impacts on the natural foraging behavior and habitat of central California steelhead. Alternative D would also result in short-term minor adverse impacts because activities associated with the repair and replacement of racks could cause localized sedimentation for a few months each year during 2013 and 2014 (outside of the seal pupping season) that would be slightly detectable in the project area. The extent of these impacts on water quality would be minimized by using standard sediment control BMPs and an approved coated lumber, which would further decrease the impacts to federally listed individuals, populations, and critical habitat. Assuming that commercial shellfish operation debris pollution would be limited in Drakes Estero, adverse impacts to central California Coho salmon critical habitat and the central California steelhead from commercial shellfish operation debris would not affect the overall structure of any natural community. The cumulative impact would be long term and beneficial, and alternative D would contribute a noticeable adverse increment to the overall cumulative impact.

For central California Coho salmon critical habitat and the central California steelhead, alternative D would be consistent with relevant law and policy. However, alternative D would not fulfill the goals articulated in *NPS Management Policies 2006* as well as alternative A would. *NPS Management Policies 2006* states that the NPS will “survey for, protect, and strive to recover all species native to national park service units that are listed under the Endangered Species Act” (NPS 2006d). USFWS and NMFS are given the authority under the ESA to determine whether or not actions jeopardize the continued existence of listed species. NPS would complete consultation with USFWS and/or NMFS to ensure that the action would not jeopardize the species’ continued existence or result in destruction or adverse modification of critical habitat.

IMPACTS ON COASTAL FLOOD ZONES

LAWS AND POLICIES

Coastal flood zones often include a variety of habitat types found below the 100-year base flood elevation that may include estuaries, salt marshes, mudflats, shoreline beaches, dunes, and maritime vegetated uplands. Protection of these resources provides an ability to absorb the forces of catastrophic flood events thereby protecting other sensitive riparian habitats. Presidential Executive Order 11988, “Floodplain Management” and the subsequent NPS DO 77-2 and *Procedural Manual 77-2: Floodplain Management* are intended to properly conserve, manage, and protect flood zones on NPS lands. The federal CZMA and the California Coastal Act are additional legislation intended to protect flood zones. The purpose of regulating activities in the flood zone is to protect human health and the environment and prevent damage to property in the event of a catastrophic flood event. An analysis of accumulated data from FEMA, survey elevations collected at the onshore facilities, and witness accounts from DBOC was performed to estimate the range of the 100-year flood zone at Drakes Estero, as described in chapter 3. Drakes Estero (including the waters of Drakes Estero and the surrounding lands up to approximately 9.0 feet NAVD 1988) falls in the coastal flood zone which is an area with the probability of being inundated at least once every 100 years due to coastal storms and tsunamis. Construction in the flood zone at Drakes Estero would require compliance with DO 77-2 and related state/federal laws. Marin County would review design plans for any proposed work in the Drakes Estero flood zone, as per chapter 23-9 of the Marin County zoning ordinance. This ordinance is designed to comply with state and federal regulations to insure structures are installed in a manner that minimizes impacts to flood zones, such as having floor elevations above the base flood elevation, use of acceptable building materials, and properly anchored structures to pilings/columns.

In accordance with *Procedural Manual 77-2: Floodplain Management*, a Statement of Findings (SOF) must be prepared if a proposed action associated with the selected alternative is found to be in a regulatory floodplain. Only alternative D would include the construction of a new structure in the flood zone, requiring the need for a SOF. The SOF would be included in the appropriate environmental compliance documents prepared for the new building as required by NEPA and DO-12.

METHODOLOGY

A 100-year flood zone elevation for Drakes Estero has not been determined by FEMA. The closest flood zone elevation determination to Drakes Estero was conducted for Bolinas Beach, approximately 17 miles south of the Seashore. At Bolinas Beach the 100-year flood elevation is 8.2 feet (NAVD-88). This elevation was compared to gauge and field survey data collected from a storm event in Drakes Estero that occurred on March 20, 2011. During this storm, much of DBOC's onshore facilities incurred flooding. Chapter 3 details the land survey and tidal gauge data used to estimate the elevation of inundation from a major storm surge and wave run-up. Based on the land survey at the onshore facilities and gauge data from the Point Reyes Light Station, for the purposes of this analysis, an elevation of 9.0 feet NAVD-88 was estimated as the flood zone elevation for Drakes Estero. The focus of flood zone impacts for each alternative is on the onshore operations and facilities that would be inundated during a flood event.

Impacts to the flood zone in terms of flood storage displacement were considered in the analysis. However, exact measurements of materials placed in Drakes Estero would change day to day as bags, trays, and anchors are removed and/or installed during the mariculture process. Similarly, precise dimensions of items at the onshore facilities such as buildings, trailers, vehicles, and shell piles necessary to measure water volume displacement from a flood event is unknown. Therefore, the methodology relies on a qualitative analysis in comparing alternatives based on predicted infrastructure needs as provided by DBOC, particularly at the onshore facilities.

The NPS Procedural Manual 77-2 requires that structures and facilities in the flood zone be designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR 60). Structures must have professionally engineered flood-proofing measures to manage flood hazards. In addition, flood warning and evacuation plans must be designed and determined to be adequate to manage flood hazards.

Procedural Manual 77-2 also applies to actions that are functionally dependent on locations in proximity to water and for which non-floodplain sites are never a practicable alternative. Examples of actions functionally dependent upon water include: marinas, docks, piers, water intake facilities, sewage outfalls, bridges, flood control facilities, water monitoring stations, drainage ditches, debris removal, outdoor water sports facilities, boardwalks to interpret wetlands, and similar water-dependent actions. Procedural Manual 77-2 requires that such structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60). Certain park functions, however, do not require adherence to Procedural Manual 77-2 when they are often located near water for the enjoyment of visitors, such as scenic overlooks, foot trails, and associated daytime parking provided the impacts of these facilities on floodplain values are minimized. In addition, entrance, access, and internal roads to or in units of the national park system are excepted from the requirements of Procedural Manual 77-2, as are historic or archeological sites or artifacts whose location is integral to their significance.

Intensity Definitions

This section will evaluate the impacts to properties located in the estimated 100-year flood zone for each alternative and the impacts of flood events on the proposed actions under consideration. The following terminology is used in describing impacts on the floodplains and flood zones:

- Negligible:** The impact is not detectable or measurable.
- Minor:** Impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surge would be minimal and would not result in an increase in potential flood damage in the project area.
- Moderate:** Impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surge would be readily apparent and would result in increased potential for flood damage in the project area.
- Major:** Impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surge would be readily apparent and would result in increased potential for severe flood damage in the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations would expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

The removal of existing on and off-shore structures would result in beneficial impacts on the Drakes Estero coastal flood zone because risks associated with dislodged and damaged materials floating and washing ashore during a flood event would be eliminated. The removal of materials that have the potential to adversely affect water quality if spilled during a flood event, such as stored fuels, paints, etc. would also be beneficial. The DBOC wastewater storage vaults would be pumped and sealed in place.

Under this alternative, certain buildings and structures, other personal property, and shell piles would be removed resulting in long term beneficial impacts to the coastal flood zone. Removal of these items would result in an increase of flood zone storage capacity equal to the volume of the items removed. Given the size of the estuary and its watershed (approximately 31 square miles), this increase would be highly localized.

Based on this information, alternative A would result in a long-term beneficial impact on coastal flood zones in the project area.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact the coastal flood zone in the project area. These actions include restoration of the developed onshore area following SUP expiration and moving the NPS vault toilet outside of the flood zone.

Restoration of the developed onshore area following SUP expiration in year 2012 would restore natural wetlands and upland vegetation communities that would provide added flood storage capacity and protect shoreline erosion from a catastrophic storm event. These restoration activities would result in beneficial

impacts on coastal flood zones in the project area. Additionally, moving the NPS vault toilet out of the flood zone would remove the risk of wastewater leaking and mixing with water from Drakes Estero during a catastrophic flood event. As such, relocating the vault toilet would result in beneficial impacts on the coastal flood zone in the project area.

Based on the information above, the impacts of these past, present, and reasonably foreseeable future actions, combined with the beneficial impacts of alternative A, would result in a long-term beneficial cumulative impacts on coastal flood zones. Alternative A would contribute a noticeable beneficial increment to the cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on the coastal flood zone due to an increase in the flood storage capacity of the onshore area and the removal of structures and materials that have the potential to become dislodged and spread into habitat buffer areas, such as tidal vegetated wetlands and shorelines, during a flood event. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impacts.

With respect to coastal flood zones, alternative A would be consistent with relevant law and policy. The removal of structures and residences in the flood zone would fulfill the goals set forth by Executive Order 11988, "Floodplain Management" and the subsequent NPS DO 77-2 and *Procedural Manual 77-2: Floodplain Management*, which are intended to properly conserve, manage, and protect flood zones on NPS lands to protect human health and the environment and prevent damage to property in the event of a flood event.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact the coastal flood zone include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued use and maintenance of onshore facilities, including continued provision of DBOC employee housing on site

All offshore structures and materials including shellfish racks, bags, and trays in 138 acres of Drakes Estero would remain in the coastal flood zone under this alternative. As part of DBOC's plan to refurbish existing racks, this alternative calls for the installation/replacement of between 1,700 and 2,500 2-inch by 6-inch rack posts in year 2013 and 380 to 750 rack posts in 2014 (DBOC 2012b^{x1}). These offshore structures and materials could be damaged and/or dislodged during a flood event, potentially causing damage to resources in Drakes Estero. The loss of flood storage due to the racks and bags placed in Drakes Estero is minor and not likely to cause flooding of other properties.

Under this alternative DBOC would include replacement of the storm-damaged floating dock and conveyor system, a new washing collection system, and continued use of setting tanks, processing plant, stringing shed, shop, punching shed, and two mobile homes, which are all located in the flood zone. Other than the docks, which are exempt from NPS flood management guidelines, it is unlikely that any of the structures would meet NPS standards for structures in the coastal flood zone. The office/warehouse, main house, and cabin would also remain, although those structures and floor elevations would continue to be above the flood elevation.

It is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents. Many of the contents of these buildings at floor level could become flooded and/or washed away and deposited into nearby sensitive areas, resulting in local contamination. Vehicles (including the forklift) and stored equipment and supplies could become inundated during a flood event. Such action could cause the release of fuels/oils into the water, as well as floating and deposition of materials across the Drakes Estero shoreline and in wetlands. Items moved by floodwaters into sensitive areas could require entry with equipment into these sensitive areas for retrieval, resulting in potential damage to wetlands and the shoreline. The two mobile homes would have water underneath the structures during a 100-year flood event, but it is expected that water would not reach the floor elevation of 11 feet.

Shell piles have been created along the shoreline of the onshore permit area in the coastal flood zone. Alternative B would allow the continued deposition of shell fragments derived from the shucking operation. These piles displace volume normally available for storage during a flood event. Adding more shells to these piles would further reduce flood storage capacity in this area.

The proposed dredging (approximately 200 cubic yards) in the vicinity of the dock for enhanced boat access would offset these impacts to a very minimal extent by creating additional flood storage capacity. Alternative B would require the continued operation of NPS and DBOC underground septic storage tanks located in the flood zone. A 100-year flood event has the potential to overwash into the tanks, causing mixing with effluent and the leakage/spillage of wastewater into waters of Drakes Estero. Septic drain fields located on the neighboring ridge do not fall in the coastal flood zone.

Based on the information above, alternative B would have a long-term minor adverse impact on coastal flood zones in the project area for an additional 10 years. Continued DBOC infrastructure and buildings, although they would occur in the flood zone, would have minimal impact on the flood zone's ability to absorb and store floodwaters or storm surges and not result in an increase in the potential flood damage beyond what already exists. Upon expiration of the SUP in 2022, the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on coastal flood zones in Drakes Estero. Impacts associated with this conversion to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact coastal flood zones in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include moving the NPS vault toilet landward of the flood zone, as

described in alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of this past, present and reasonably foreseeable future action would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future action, when combined with the long-term minor adverse impacts of alternative B, would result in a long-term minor adverse cumulative impact on the coastal flood zone. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on coastal flood zones beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative B would result in long-term minor adverse impacts on the coastal flood zone in the project area for an additional 10 years because continued DBOC operations would take place in the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities, and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and would not increase the potential for flood damage. Offshore structures and materials could be damaged and/or dislodged during a flood event, potentially causing damage to resources in Drakes Estero. Onshore, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent. Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.

NPS guidelines require that new actions in the flood zone comply with *Procedural Manual 77-2: Floodplain Management*. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with *Procedural Manual 77-2* guidelines. No new structures would be constructed under alternative B. As such, this alternative would comply with existing NPS guidelines and procedures.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact the coastal flood zone are the same as described under alternative B.

Impacts on the coastal flood zone would be the same as described for alternative B. As part of DBOC's plan to refurbish existing racks, this alternative calls for the installation/replacement of between 1,700 and 2,500 2-inch by 6-inch rack posts in year 2013 and 380 to 750 rack posts in 2014. Impacts to offshore infrastructure include the potential dislodging of offshore equipment during a flood event, causing such equipment to float ashore.

Impacts on the coastal flood zone include those buildings and wastewater collection systems described in alternative B that are situated on land below the 9-foot elevation NAVD '88. Human occupation in the coastal flood zone would continue, and all structures and DBOC personal property would remain in the flood zone until year 2022. Onshore impacts include the loss of flood zone functions and flood storage. Alternative C would also include the dredging of Drakes Estero at the dock creating additional flood storage capacity.

Based on the information above, alternative C would have a long-term minor adverse impact on coastal flood zones in the project area for an additional 10 years. Continued DBOC infrastructure and buildings, although they would occur in the flood zone, would have minimal impact on the flood zone's ability to absorb and store floodwaters or storm surges and not result in an increase in the potential flood damage beyond what already exists. Upon expiration of the SUP in 2022, the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on coastal flood zones in Drakes Estero. Impacts associated with this conversion to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact coastal flood zones in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include moving the NPS vault toilet landward of the flood zone. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of this past, present and reasonably foreseeable future action would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future action, when combined with the long-term minor adverse impacts of alternative C, would result in a long-term minor adverse impact on the coastal flood zone. Alternative C would contribute an appreciable adverse increment to the overall cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on coastal flood zones beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative C would result in long-term minor adverse impacts on the coastal flood zone in the project area for an additional 10 years because continued DBOC operations would take place in the flood zone and would result in continued potential for flood damage to property and/or environmental contamination at the project site. However, these activities and the associated infrastructure would have a minimal impact on the ability of the coastal flood zone to absorb and store floodwater or storm surge, and

would not increase the potential for flood damage. Offshore structures and materials could be damaged and/or dislodged during a flood event, potentially causing damage to resources in Drakes Estero. At the onshore facility, it is anticipated that the punching shed, shop, processing plant, and stringing shed would be inundated during a 100-year flood event, potentially causing damage to the structures and contents as well as causing local contamination. Shell piles would reduce flood storage capacity in the area, whereas proposed dredging in the vicinity of the dock would offset these impacts to some extent. Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing untreated wastewater to enter Drakes Estero. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

NPS guidelines require that new actions in the flood zone comply with NPS *Procedural Manual 77-2: Floodplain Management*. This alternative would allow the continued use of nonconforming structures and the replacement of storm damaged structures (dock and washing station) in the coastal flood zone. However, existing structures are grandfathered, and do not have to comply with Procedural Manual 77-2 guidelines. No new structures would be constructed under alternative C. As such, this alternative would comply with existing NPS guidelines and procedures.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact the coastal flood zone are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact the coastal flood zone include:

- Increased production limits
- Replacement of the existing onshore processing plant building and storm damaged structures to include the dock and washing station.

Alternative D includes consideration of new development to replace existing onshore facilities and a 40 to 70 percent increase in production levels compared to alternatives B and C, respectively. Onshore changes would include the removal of the existing processing plant, to be replaced by a larger, more modern facility that would serve multiple functions. New development would require additional site planning and design considerations and would be evaluated under separate review. Any new development would be built in accordance with relevant standards, including local building codes. Impacts to coastal flood zones resulting from the continuation of the shellfish operation for an additional 10 years under alternative D are described as follows.

As part of DBOC's plan to refurbish existing racks, this alternative calls for the installation/replacement of between 1,700 and 2,500 2-inch by 6-inch rack posts in year 2013 and 380 to 750 rack posts in 2014 (DBOC 2012b^{xli}). Increased shellfish production could lead to the placement of more shellfish infrastructure such as floating bags, trays, and bottom bags in the coastal flood zone compared to the other alternatives. These additional structures would occupy areas of flood storage, but the displacement in the flood zone is expected to be negligible and will not impact other areas or properties. Impacts on the

flood zone from dislodged equipment floating to the shoreline would be expected to be similar to those described for alternatives B and C.

The construction of new facilities could take place in the flood zone if alternative site locations outside of the flood zone but in the SUP area were determined to be infeasible through a subsequent planning process. If located in the flood zone, new facilities would result in continued potential for flood damage to property and/or environmental contamination at the project site. Wastewater collection systems would remain as described in alternatives B and C, and flood zone impacts from other structures (punching shed, stringing shed, dock, washing station, and mobile homes) would be the same as those under alternatives B and C. An increase in production would likely result in the addition of more shells to the existing piles in the flood zone, resulting in a reduction of flood storage capacity.

Based on the information above, alternative D would result in long-term minor to moderate adverse impacts on coastal flood zones in the project area for another 10 years. Alternative D impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surges would be readily apparent. The additional infrastructure proposed under this alternative at the onshore facilities could result in the increased potential for flood damage in the project area compared to other alternatives. However, this could be mitigated by following guidelines set forth in NPS Procedural Manual 77-2, complying with Marin County building codes and FEMA recommendations for structures in the flood zone, and implementing architectural design elements specific to minimizing flood damage.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to coastal flood zones in Drakes Estero. Impacts associated with this conversion to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact coastal flood zones in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include moving the vault toilet landward of the flood zone. For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of this past, present and reasonably foreseeable future action would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term minor to moderate adverse impacts of alternative D, would result in a long-term minor to moderate adverse cumulative impact on the coastal flood zone. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on coastal flood zones beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A

Conclusion

Overall, alternative D would result in long-term minor to moderate adverse impacts on the coastal flood zone due to continued shellfish operations. Structures would remain in the flood zone, which could result in an increased potential for flood damage to property or environmental contamination at the project site. Alternative D impacts on the ability of the coastal flood zone to absorb and store floodwaters or storm surges would be readily apparent. The additional infrastructure proposed under this alternative at the onshore facilities could result in the increased potential for flood damage in the project area compared to other alternatives. However, this could be mitigated by following guidelines set forth in NPS Procedural Manual 77-2, complying with Marin County building codes and FEMA recommendations for structures in the flood zone, and implementing architectural design elements specific to minimizing flood damage. Compared to alternatives B and C, alternative D would result in a slight increase of flood zone impacts from the offshore facilities due to additional racks and bottom bags to accommodate the higher shellfish production level. The construction of new facilities may take place in the flood zone if alternative site locations outside the flood zone but in the SUP area were determined to be infeasible through a subsequent planning process. If located in the flood zone, the new facility would result in continued potential for flood damage to property and/or environmental contamination at the project site. Wastewater collection systems would remain as described in alternatives B and C, and flood zone impacts from other structures (punching shed, stringing shed, dock, washing station, and mobile homes) would be the same as those under alternatives B and C. An increase in production would likely result in additional shell being added to the shell piles located in the flood zone, resulting in a reduction of flood storage capacity. The cumulative impact would be long term minor to moderate, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.

Alternative D would include new onshore development, which is a Class I Action as specified in the NPS *Procedural Manual 77-2: Floodplain Management*. As such, the new structure would require a SOF if alternative site locations outside the coastal flood zone, but in the SUP area, were determined to be infeasible. The SOF process would ensure that the structure is properly designed and constructed in a way that minimizes impacts to the flood zone. However, any remaining structures are grandfathered, and do not have to comply with these guidelines.

IMPACTS ON WATER QUALITY

LAWS AND POLICIES

The federal Water Pollution Control Act, more commonly known as the CWA (33 U.S.C. sections 1257-1387), was first promulgated in 1972 and later amended multiple times (e.g., 1977, 1987, and 1990). This law is designed to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters,” including the waters of the national park system. NPS policy requires that the NPS take the following steps to protect water quality (NPS 2006d).

- Work with appropriate governmental bodies to obtain the highest possible standards available under the CWA for the protection of park waters;

- Take all necessary actions to maintain or restore the quality of surface waters and groundwaters in the parks consistent with the CWA and all other applicable federal, state, and local laws and regulations; and
- Enter into agreements with other agencies and governing bodies, as appropriate, to secure their cooperation in maintaining or restoring the quality of park water resources.

The NPS policy goal is to protect pristine water quality and improve impaired water quality by supporting the CWA protections and provisions for designated unimpaired and impaired waters.

Methodology

As described in chapter 3, Drakes Estero has minimal freshwater input (Anima 1990^{xlii}, Press 2005), and is characterized as a shallow, open embayment, with an average subtidal depth of around 6.5 feet at high tide (Anima 1990^{xliii}, Wechsler 2004^{xliv}). Because of the open character of the lagoon and the low freshwater input, most of Drakes Estero is flushed by a semidiurnal (twice-daily) tidal cycle with a tidal range of around 6 feet. Salinities in Drakes Estero approach coastal Pacific salinities (around 34 parts per thousand) (NOAA 2010). With an average depth of 6.5 feet (CCC 2007a) and a tidal range of approximately 6 feet, Drakes Estero exchanges a substantial portion of its high-tide volume each tidal cycle with Drakes Bay. Overall, the small degree of human-caused alterations (Baltan 2006) in the watershed, coupled with Drakes Estero's short tidal flushing cycle (residence period) and the tidal flushing with upwelled oceanic water (NAS 2009) are the primary reasons for the high water quality in Drakes Estero.

Nutrient levels in Drakes Estero are greatly influenced by upwelling conditions derived from oceanic water that enters the Estero each tidal cycle (NAS 2009). Likewise, harmful algae blooms such as red tide and algae causing PSP can occur anywhere along the California coastline on a regional scale. On occasion, such blooms can also be imported into Drakes Estero by tidal action, affecting the shellfish cultured by DBOC. DBOC currently participates in a state-wide monitoring plan to detect harmful algae consumed by commercial shellfish.

Other than the chemical and biological conditions from oceanic waters, there are three direct sources that affect water quality in Drakes Estero: runoff from cattle operations in the watershed, the biological effects of the oysters, and the actions of the shellfish operations. The analysis assumes cattle operations will remain constant throughout the next 10 years. With regard to biological effects of the oysters, Newell (2004) and Dumbauld, Ruesink, and Rumrill (2009) provide excellent summaries of the ecological effects of bivalves, one of which is the improved water quality from oysters filtering sediments, nutrients, and phytoplankton from the water column. However, it should be noted that most of the studies showing measurable beneficial effects of bivalve filtering were conducted in estuaries with relatively turbid waters full of particulates, with low to moderate tidal flushing. By contrast, Drakes Estero has a high flushing rate and is not a highly turbid coastal embayment (Wechsler 2004^{xlv}, NAS 2009).

The only data measuring the filtering effects DBOC oysters may have on water quality in Drakes Estero is from Wechsler (2004^{xlvi}), which indicates that no appreciable difference exists between water quality samples taken in Schooner Bay immediately adjacent to racks compared to Estero de Limantour where no mariculture occurs. Several reasons may explain this outcome. Many of the oysters grown by DBOC are

placed in the main body of Drakes Estero on racks or in bags on the sandbars and mudflats up to 9 months (DBOC 2012b^{xlviii}). At these locations, residence times are rather short, and oysters are often not in contact with the water during low tide particularly when oysters are hardened, thus reducing the time and the amount of water filtered during a typical tidal cycle. Another factor affecting the filtering capacity is individual oyster size NAS (2012). The number of adult oysters in Drakes Estero on any one day is but a fraction of the annual production rate, and much of the cultured oysters capable of filtering the water comprise small juvenile size classes that provide lower daily filtration rates compared to adults (Powell et al. 1992). Given these conditions, bivalve contributions to water quality at Drakes Estero are likely to be relatively minor.

The evaluation of impacts related to shellfish operation activities and the role of shellfish in marine biology and water chemistry processes could be unnecessarily duplicated between impact topics in this EIS. This section evaluates impacts on water quality in the broad context of shellfish operation activities, while the discussion on water quality effects on specific marine and biological resources (microbenthos, subaquatic vegetation, oyster pseudofecal sediment deposition, trophic levels, eelgrass, fisheries, etc.) are discussed more thoroughly in the other sections of this chapter (i.e., “Impacts Wildlife and Wildlife Habitat: Benthic Fauna,” “Impacts on Wildlife and Wildlife Habitat: Fish,” and “Impacts on Eelgrass”). ,

In general, human-induced impacts on water quality derive from point and non-point sources. Point sources are concentrated flows from pipes or channels entering the environment, often related to industrial operations. Non-point sources include intermittent events that enter the environment at multiple locations, such as runoff from impervious surfaces (roofs, parking areas, roadways, docks), surface runoff containing nutrients or leached pesticides, and possibly contaminated groundwater sources laterally entering the surface water. This section discusses non-point sources specific to land development and the shellfish operations such as onshore stormwater runoff, boat operation, intermittent disturbances to Drakes Estero substrate from maintaining oyster racks and placing/overturning/removing bottom bags in the Drakes Estero intertidal zone, accidental spill of fuel/oil, accidental spill/leaks of wastewater from underground septic tanks, use of treated lumber for racks, and cattle waste from nearby pastures. Although Zubkousky (2011) describes pollution sources as “solely non-point,” the discharge (recycling) of pumped water drawn from Drakes Estero used to fill the setting tanks and to wash harvested shellfish could be considered a point source. However, there are no known uses of pesticides or foreign chemicals associated with the discharge of the water from the setting tanks and the washing station.

Studies on water quality related to commercial shellfish operations have been performed worldwide in a vast array of aquatic regimes. The assessment in this EIS relies on data specific to the immediate project area, and inferences based on offsite studies in similar environments were used as supporting information. Onsite studies include the work over decades by the CDPH regarding harmful bacteria and toxic algae, water quality reporting by Anima from the early 1990s, and Wechsler’s work measuring nutrients and turbidity levels from 2003. Because shellfish are filter feeders, it was important as part of this assessment to look at the onsite studies to evaluate the influences, if any, DBOC shellfish may have on water quality. In this regard, the only data at Drakes Estero that compares water quality parameters in Schooner Bay (commercial shellfish operations) and in Estero de Limantour (no commercial shellfish operations) was collected by Wechsler. This data was used in the analysis. Offsite studies were utilized where onsite data gaps existed.

Impact intensity levels for water quality are developed for this section to discern differences between alternatives. This can only be qualitatively evaluated because empirical on-site water quality parameters for each proposed action are not possible.

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on water quality would be slightly detectable and localized (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area.
Moderate:	Impacts on water quality would be readily apparent and would alter natural water quality conditions in the project area.
Major:	Impacts on water quality would be readily apparent and widespread and would severely alter the natural water quality conditions in the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

Bivalves can play an important role in water quality as suspension feeders (Dame 1996; Mazouni et al. 1996; Gilbert et al. 1997; Newell 2004; Dumbauld, Ruesink, and Rumrill 2009). Shellfish are capable of capturing and processing suspended inorganic silt, organic particulates, and phytoplankton from the water column, thus reducing water turbidity and allowing more sunlight to reach the bottom substrate. Bivalves, through ingestion and processing of suspended particles, also remove nitrogen and phosphorus from the water column, and either sequester these nutrients as tissue and shell or transfer these materials as feces and pseudofeces deposited to the sediment surface. Some of the nitrogen absorbed by bivalves is excreted as urine back into the water column elevating the level of dissolved nitrogen as ammonia for use by new phytoplankton and microbenthic organisms (Newell 2004).

In the context of Drakes Estero, nutrient inputs are primarily a function of Drakes Estero's physiographic structure (i.e., shallow lagoon with a high tidal prism) (Wechsler 2004^{xlviii}) allowing tidal flushing from upwelling (Kozloff 1983; Morgan 2001) with short residence periods (NAS 2009; Dumbauld, Ruesink, and Rumrill 2009). The pollutants entering Drakes Estero from the watershed are diluted by the large volume of water entering the lagoon each high tide and transported out to Drakes Bay during each low tide. Wechsler (2004) found that the water quality parameters measured adjacent to oyster racks were virtually the same as those collected from waters far removed from oysters (Estero de Limantour). These measurements support a conclusion that water quality in Drakes Estero is influenced by oceanic sources (Kozloff 1983; Morgan 2001) derived from large input volumes each tidal cycle much more so than the presence of filter feeding bivalves. The physiographic characteristic, coupled with few human-caused

disturbances in a relatively small watershed (Zubkousky 2010), are the overriding properties of Drakes Estero affecting water quality. Again, bivalves do capture pollutants as their food source, and can influence water quality in some estuaries (Mazouni et al. 1996; Newell 2004). Site specific water quality data measured by Wechsler (2004^{xlix}) suggest the water quality conditions in Schooner Bay with shellfish are very similar to Estero de Limantour where no commercial shellfish operation is present.

NAS (2012) estimated the time required for DBOC oysters to filter all of the water in Drakes Estero to be 34 days. There are a number of assumptions that are inherent in this calculation that raise the level of uncertainty for the basis the NAS conclusion. The NAS assumes that residence time in Schooner Bay is 1-2 weeks, and acknowledges that residence time in the main body of Drakes Estero is less than 1 day. The calculations and assumptions made by the NAS (2012) report appear to assume that all oysters are being grown in areas where water residence times are on the order of 1-2 weeks. In fact, many of the oyster racks and nearly all of the bottom bag and shell hardening areas are located on sand bars in the main body of Drakes Estero where the water residence time is less than one day. DBOC has indicated that most of the strings from the racks are placed on sand bars for shell hardening for a period of 2 to 9 months (DBOC 2012b^l). Most of the oysters on racks are exposed to the air twice daily during the low tide cycle, and all of the bags and strings for shell hardening on sand bars are exposed twice daily. The NAS assumption is that the oysters are filtering 24 hours per day. NAS (2012) cited filter rates per oyster ranging between 20 to 50 gallons per day (0.075 to 0.19 m³/day). The NAS (2012) uses the lower range of 20 gallons based on a study by Powell et al. (1992) for their assumption. However, the model that most accurately estimates oyster filter rates, according to the Powell et al. study, requires that an oyster must be over 4 inches long to filter 20 gallons of water per day. Oyster sizes on any given day range in size from seeds less than 0.5 inches long to harvest-size adults. Recognizing that market size for Pacific oyster is generally 3-4 inches, it can be assumed that many of the DBOC oysters in Drakes Estero are less than 4 inches long. Therefore the reported filtration rate for most cultured oysters present in Drakes Estero would be expected to have filtration rates lower than 20 gallons per day.

Assuming 2 inches as a reasonable average oyster length for all oysters in the Estero (juveniles and adults), the filter rate for a 2-inch oyster is 6.3 gallons per day (0.024 m³/day) according to Powell et al. (1992). Even if using the annual production rate of 5,340,000 oysters (an overestimate compared to the actual number of oysters in the Estero on any given day), DBOC oysters would only filter less than 1 percent (0.94 %) of the water in Drakes Estero each tidal cycle based on the volume of water in Drakes Estero of 13,629,974 m³ as calculated by NAS (2012). This equates to an estimated time required for DBOC oysters to filter all of the water in Drakes Estero to be just over 106 days assuming a closed system. With less than 1 percent of Drakes Estero being filtered by DBOC oysters each tidal cycle and the findings by Wechsler (2004^{li}), these data suggest that ceasing shellfish operations and removing the functional ability of the oysters to filter water within Drakes Estero is not likely to result in any appreciable differences in water quality.

Pathogenic water quality monitoring conducted by the CDPH indicates that the inputs from upstream sources originating from the cattle ranches intermittently affect the pathogen levels in the upper bays of Drakes Estero. The upper reaches of the bays are included in the current permit area. Yet because of CDPH's mandate to protect the health and welfare of the public consuming DBOC oysters, DBOC is prohibited from having culture beds in those areas where filter feeding benefits to water quality could otherwise be most beneficial. Nonetheless, fecal coliform levels measured from water samples collected by DBOC were found to be far below the level required for shellfish growing waters. In addition, water

quality monitoring data collected from Drakes Estero reveal that the water quality standards for pathogens are far below the thresholds required for contact recreational use (including swimming and boating). The removal of the commercial shellfish operations, including the existing facilities, would not be expected to modify the pathogen levels appreciably, or result in a pollutant level that would prohibit the continued use of Drakes Estero for recreation.

Removing sources of potential hydrocarbon spills, eliminating bottom scarring caused by motorized boats, and removing the potential for sediment transfer around racks and bags from tidal flows would benefit water quality in the project area.

In general, the effects of pressure treated wood on water quality in an estuary are strongly dependent upon the amount of wood, the age of the wood, and the dilution caused by water movement (Weis and Weis 1996, NOAA 2009). Two common preservatives used in the region include ammoniacal copper zinc arsenate (ACZA) and chromate copper arsenate (CCA), both of which have the ability to release copper into the aquatic environment.

The majority of leaching from wood treated with ammoniacal copper zinc arsenate (ACZA) in saline waters occurs in the first 10 days (Brooks 1995, NOAA 2009). For wood treated with chromate copper arsenate (CCA), all of the leaching occurs in the first 90 days (Sanger and Holland 2002). Consequently, the wooden structures in Drakes Estero, whether treated with ACZA or CCA, have been in contact with water in Drakes Estero for years and are not expected to continue the release of wood preservative leachates into the aquatic environment.

Equipment from the racks and bags have become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. The primary debris associated with commercial shellfish production that has been observed in and along the shores of Drakes Estero includes the plastic spacers used in hanging culture (to separate clumps of oysters) and Styrofoam floats (used for floating bags).

Removal of the offshore infrastructure is expected to cause temporary sediment disturbances to the Drakes Estero bottom over the course of 2 to 3 months, resulting in particulate accumulation in the immediate work area as 4,700 posts are removed. Dismantled boards would be transferred by boat to the onshore facilities where the boards would be disposed at an offsite location. Standard BMP practices would be implemented during the rack removal process. This would be a one-time action, compared to intermittent disturbances from multiple visits to the offshore infrastructure related to continued oyster cultivation under the action alternatives. Sediment disturbances from boats, anchors, and walking personnel dismantling the racks and collecting bags etc. would cause a temporary increase in turbidity that could affect localized fish and shellfish populations. Removal of structures would be conducted using silt curtain and other BMPs to minimize sediment disturbance or transport to the area around the racks. Sediment plumes from facility removal would dissipate as the tidal flushing cycles bring new supplies of oceanic water to replenish Drakes Estero. There would be no further need for water quality sampling to satisfy CDPH, which would eliminate the need for boat traffic to the water quality stations, particularly those in the upper reaches of the bays where boat traffic is solely for collecting water samples. Onshore operations would cease under alternative A, and DBOC equipment and personal property would be removed. In addition, the dock, work platform, and stringing shed damaged during the March 2011 storm would be removed for health and safety purposes. Several additional temporary structures would be removed from the onshore area. During removal of these features, standard BMP practices will be

employed to reduce sediment erosion into the neighboring wetlands or other waters. Collectively, the removal of these structures could cause onshore soil disturbances, resulting in a temporary increase in non-point-source runoff pollution until the soil is stabilized. Sediment erosion into neighboring wetlands or other waters could cause local turbidity levels to temporarily rise, impacting wildlife and fish habitats in wetlands and other waters. Tidal flushing would dissipate any turbid waters, resulting in these impacts being short-term.

Removal of onshore facilities could provide long-term benefits to water quality with the elimination of impervious surfaces that are non-point sources of water pollutants. DBOC operations include several wastewater tanks and pumps at the onshore facilities. Wastewater is pumped into two underground drain fields located upslope from the operations facility. While the wastewater system would remain, the tanks would be pumped, and its operation would be discontinued with closure of the remaining structures. Therefore, the risk of wastewater entering Drakes Estero from a treatment facility failure or pumping leaks would cease.

Use of the setting tanks and the washing station would end under this alternative. As such, water would no longer be pumped from Drakes Estero for these two operations, and the discharge of secondary contaminants normally included in the washing station wastewater, such as sediments attached to harvested shellfish and fouling aquatic organisms, would no longer be released back into Drakes Estero.

Vehicular traffic to and from the operations facility is dictated by employee travel, distribution/delivery trucks, and visitors to DBOC. The termination of the commercial shellfish operations would eliminate the vehicle use associated with it, resulting in fewer sources of fuels/oils and other pollutants entering Drakes Estero.

Although DBOC facilities would be removed, NPS facilities would remain under this alternative. Non-point sources of pollutants reaching Drakes Estero would continue from the access road and canoe/kayak parking lot. These sources would be very small due to the limited use the parking lot receives, and would have a minor adverse effect on the Drakes Estero ecosystem as a whole. The vault toilet near surface waters and wetlands would also remain. These facilities pose some risk of fecal coliform being introduced to Drakes Estero from pumping spills or undetected leaks. Such contaminants could temporarily affect water quality for aquatic species until flushed by tidal action or absorbed by biological processes. No spills have occurred in the past, and it is unlikely that the vault toilet would cause adverse impacts on water quality. Relocation of the vault toilet is discussed as a cumulative action below.

As described above, alternative A would result in long-term beneficial impacts on water quality due to the reduction of non-point-source runoff and the elimination of future disturbances to the Drakes Estero bottom from boats and offshore structures. Removal of the racks and bags would cause a short-term minor adverse impact on water quality due to the sediment disturbances from personnel removing the offshore structures. These adverse impacts would be temporary and localized.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact water quality in the project area. These actions include restoration of the developed onshore area following SUP expiration,

the existing fire management plan, coastal watershed restoration projects in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project), existing ranching operations, and moving the vault toilet out of the flood hazard area.

Restoration of the developed onshore area following SUP expiration would remove remaining infrastructure from the onshore areas, including the wastewater treatment system, and would establish natural wetlands and upland vegetation communities that serve as natural shoreline buffers for filtering pollutants. These restoration activities would result in long-term beneficial impacts on water quality in the project area. Fire management activities associated with the Seashore's current fire management plan could result in the runoff of ash and nutrients into Drakes Estero. This runoff would result in a minor adverse impact on water quality in the project area. Additionally, recent coastal watershed restoration projects in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project) included removal of existing structures with the potential to fail. As such, recent watershed restoration efforts have resulted in beneficial impacts on water quality in Drakes Estero. Ranching activities, such as those performed in the Seashore, have the potential to introduce animal waste (fecal coliform) into the watershed via runoff. NPS will continue to work with ranchers to identify and implement BMPs to reduce potential pollutant loading to waterbodies throughout the Seashore. Continued ranching in the project area would result in minor adverse impacts on the water quality of Drakes Estero. Moving the NPS vault toilet away from the shoreline would remove the risk of wastewater leaking and mixing with water from Drakes Estero during a catastrophic flood event resulting in beneficial impacts on the water quality in Drakes Estero.

Based on the information above, the impact of these past, present, and reasonably foreseeable future action would be long-term minor adverse. The impact of these past, present, and reasonably foreseeable future actions, when combined with the short-term minor adverse and long-term beneficial impacts of alternative A, would result in a long-term beneficial cumulative impact to water quality in Drakes Estero. Alternative A would contribute a noticeable beneficial increment to the cumulative impact.

Conclusion

Drakes Estero is not a highly turbid coastal embayment (NAS 2009), and based on west coast research (Dumbauld, Ruesink, and Rumrill 2009), the beneficial biochemical effects typically attributed to bivalves, such as nutrient cycling and water clarity, are expected to be highly localized in Drakes Estero. This is because the nutrient dynamics in these systems are driven by coastal upwelling and a strong tidal cycle rather than by bioprocesses from shellfish. However, bivalves remove particulates in the water column that may influence eelgrass productivity near beds and racks (see discussion under alternative B).

Overall, alternative A would result in long-term beneficial impacts on water quality as a result of reduced non-point-source runoff and the elimination of future disturbances to the Drakes Estero bottom from boats and offshore structures. No releases of toxic levels of copper from wood preservatives would be expected under this alternative. The removal of the racks and bags would cause a short-term minor adverse impact on water quality due to the sediment disturbances from personnel removing the offshore structures. These adverse impacts would be temporary and localized. The cumulative impact would be long term and beneficial, and alternative A would contribute a noticeable beneficial increment to the cumulative impact.

With regard to water quality, alternative A would satisfy the goals and objectives of NPS *Management Policies 2006* (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact water quality include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic
- Installation of sediment filter at the onshore facility

As filter feeders, shellfish provide beneficial water quality functions with their ability to remove suspended solids, nutrients, and phytoplankton from the water column. Nutrients entering Drakes Estero are primarily derived from oceanic sources. Pollutant runoff from cattle operations and other non-point sources from the relatively small watershed enter Drakes Estero. Because these pollutants have the potential to be captured and processed by the cultivated shellfish, harvesting restrictions are in place to protect public health. Under this alternative, cultivated shellfish would remain in Drakes Estero providing localized benefits to water quality by filtering and processing a portion of those pollutants entering the water from the watershed. As discussed in alternative A, however, the overriding influence affecting water quality is the ability of Drakes Estero to drain most of its water at low tide and replace that water during the next high tide cycle with upwelled oceanic water transporting a renewed supply of nutrients (Kozloff 1983; Morgan 2001).

Wechsler’s study (2004^{lii}) compared water quality parameters adjacent to oyster racks in lower Schooner Bay with samples taken in the Estero de Limantour where no oysters are cultured. The study found no appreciable difference in water quality. This can be explained by the fact that DBOC oysters are cultured primarily in the main body of Drakes Estero where the residence time is short compared to the upper fingers of the bays. Additionally, the volume of water filtered by a single oyster is directly related to the size of the oyster (Powell et al. 1992), and many of the oysters cultured in Drakes Estero on any given day are juveniles with low filter rates compared to adults. Furthermore, the majority of oysters are located on racks, sandbars, and mudflats that are not in contact with water during low tide, particularly those oysters set aside during the shell hardening process. An analysis of the daily filter rate resulted in less than one percent of the water in Drakes Estero is filtered by DBOC oysters (see alternative A discussion). Based on these conclusions, DBOC oysters have limited ability to measurably alter water quality in Drakes Estero.

Impacts on water quality from managing the offshore facilities would be expected to be intermittent, occurring when employees visit racks and bags. DBOC’s permitted growing area would include up to 138 acres of culture beds, including 84 acres for bottom bag culture. DBOC operations have the potential to cause impacts such as temporary intermittent sediment disturbances to the Drakes Estero bottom, resulting in higher than normal particulate concentrations in the localized work area as DBOC employees

manage racks and install, harvest, or flip bags and trays lying on the floor of Drakes Estero. These intermittent disturbances include workers walking across mudflats, boat hulls running aground on the mudflats, and bag maintenance/harvesting actions. These activities occur approximately eight hours a day six days each week, resulting in temporary disturbances affecting water quality. Such impacts increase turbidity, affecting fish and shellfish habitat in the immediate vicinity of the work area and causing sediment plumes that may affect nearby eelgrass beds. Sediment plumes from offshore operations would dissipate through daily tidal flushing. Continued motorized boat traffic is necessary to manage the offshore facilities and would continue under this alternative, resulting in intermittent sediment disturbances and substrate scarring from propellers when boats enter shallow waters outside established deep-water channels. Also, as indicated by DBOC (DBOC 2012b^{liii}) floating culture is currently anchored on existing dilapidated racks and in areas immediately adjacent to existing rack culture. Under alternative B, all racks (once repaired) would likely be fully utilized for wire culture (DBOC 2012b^{liv}), and floating culture comprised of concrete anchors and attached lines may be relocated to areas adjacent to racks using concrete anchors, etc. Water quality from such actions would be impacted by temporary increased turbidity levels.

Boats are fueled by hand, using gasoline/oil products from 6-gallon containers approved for fuel storage. There are no underground fuel tanks at the project site. Accidental spills may occur while pouring fuel into boat tanks using the 6-gallon containers. Such fuel/oil spills could enter Drakes Estero and become consumed by or attached to local fish and wildlife. However, because fuels are handled in small-volume containers, the risk of large fuel spills causing significant water quality impacts is very small.

Between 2005 and 2007, DBOC conducted repair of racks using AZCA treated wood as authorized by the NPS. Repair to the racks was discontinued in 2007 as a result of a CCC Cease and Desist Order issued to DBOC for unpermitted activities, and to-date, repair of racks have not resumed. Replacement of offshore wooden structures would occur under this alternative. Alternative B is expected to maintain the same number of oyster racks currently in use, which amounts to 95 racks spaced across the larger 1,083-acre, open water leased area. Of these 95 racks, 50 racks would be replaced in year 2013 and 25 racks replaced in year 2014. Wooden racks and a new dock constructed from pressure-treated lumber would remain until year 2022.

The most commonly used chemical treatments for lumber in marine environments are either ACZA or CCA. Most of the preservatives remain affixed to the wood fibers; however, some may leach into the aquatic environment to remain in solution, become absorbed by aquatic plant life (Lyngby and Brix 1984) or become attached to sediment once submersed in water (Brooks 1996; Weis and Weis 1996). Scientists have discovered that most of the leaching of ACZA occurs in the first 10 days of exposure to salt water (NOAA 2009), whereas Sanger and Holland (2002) describe the amount of CCA leaching in water decreases by approximately 50 percent each day, and 99 percent of the leaching is completed in the first 90 days after installation. The Western Wood Preservers Institute (2011) developed a model used to estimate dissolved copper concentrations in aquatic environments resulting from treated wood leachates. This model, known as the box model, estimates copper leachate concentrations from a single project based on a construction timeline of 0.5 days, which is not applicable to since it will take months to repair racks. Furthermore, the model does not take into consideration other factors such as plant absorption of soluble copper, which can be significant (Lyngby and Brix 1984), or the use of sealants. Thus, the model is not a useful tool in accurately predicting copper leachate concentrations in this analysis.

Because of the large quantity of treated lumber necessary to replace racks by year 2014, regulatory approvals would be necessary under this alternative. DBOC would be required to submit a site-specific plan and repair schedule for agency review. In 2011, the USACE issued an emergency permit for the dock damaged by the March 20, 2011 storm, and as a condition to that permit, they required “any chemically treated wood material must be coated with an impact-resistant biologically inert substance” (USACE 2011b). Regulatory approvals for rack replacement will likely include such a mitigating step as using a wood sealant to reduce copper leachates, as well as conducting repairs during the summer months when coho salmon and steelhead are less likely to occupy Drakes Estero for spawning (Busby et al. 1996, Good et al. 2005, NMFS 2010).

Over the years, the washing of harvested oysters at the onshore facilities near the existing floating dock has resulted in the accumulation of sediments and shell fragments returning into Drakes Estero. Alternative B includes the one-time dredging of a 30-foot by 60-foot area immediately around the floating dock to provide boat access to the dock. Dredging would be done using an excavator backhoe to remove the sediment. A total of approximately 200 cubic yards of sediment would be dredged and loaded onto dump trucks for hauling to an approved deposition site. Water quality impacts from dredging actions include increased turbidity in the localized work area. Impacts from this action could be mitigated with the use of a floating siltation curtain surrounding the work area in order to contain suspended sediments to the disturbed area.

Sediment disturbances to the Drakes Estero bottom from all offshore activities have the potential to release pesticides and herbicides that may have accumulated in the sediment over time into the water column. An analysis of sediment cores sampled by Anima (1990^{lv}) in Drakes Estero found the level of herbicides and pesticides to be “low or below the analytical cutoff points for the compounds tested, except for DDE (Dichlorodiphenyldichloroethylene), which in Schooner Bay, Estero de Limantour, Abbotts Lagoon, Barries Bay, and Creamery Bay did show concentrations between 0.1 to 2.1 µg/kg.” The detection limit for DDE was 0.1 µg/kg. By comparison, Anima (1990^{lv}) reports the NAS National Academy of Engineering recommended safe level as “1,000 µg/kg (sum of DDD, DDE, and DDT) wet weight for the protection of fish eating wildlife.

The offshore shellfish operation has historically caused debris from shellfish operations such as floats, spacers, and tubes to unintentionally become dislodged and deposited in the aquatic environment of Drakes Estero. While realizing this as an ongoing possibility, the degree and intensity to which materials could become dislodged in the future is unknown. The various forms of debris are accepted materials for use in culturing shellfish. However, once dislodged, the materials become a pollutant. The conditions of the SUP and the CCC CDO would require that DBOC continue to remove marine debris from shellfish operation equipment. It is assumed that under alternative B, limited incidental debris related to commercial shellfish operations would continue to be present in the aquatic environment. DBOC cleanup procedures also would disrupt water quality should workers disturb the soft bottom of Drakes Estero when retrieving loose debris from intertidal mudflats.

Water quality monitoring data collected from Drakes Estero reveal that the water quality standards are far below the thresholds necessary to prohibit recreational use. The continuation of the offshore shellfish operations is not expected to modify the water quality to a level that would prohibit the continued use of Drakes Estero by visitors seeking to use it for recreational purposes.

Onshore operations under alternative B would continue using the existing DBOC equipment and structures. These facilities have impervious surfaces, creating a non-point-source of runoff that enters Drakes Estero during rain events. The degree of pollutant loading, however, is very low given the small amount of impervious surface (less than 3 acres—a very small percentage of the entire watershed). Tidal flushing would dissipate such pollutant loads to in acceptable water quality levels.

Alternative B would result in discharge of water used for onshore operations. Water is pumped directly from Drakes Estero and used for two purposes: establishing a controlled environment to seed larval shellfish and spray-washing harvested shellfish. Water for seeding shellfish larvae is used at two onshore stations: the indoor microcultch station and the outdoor cluster setting tanks. Drakes Estero water is circulated through these two stations and returned to Drakes Estero (see chapter 2) via underground PVC pipes that emerge in the intertidal zone where the water is released back into Drakes Estero. Water used to spray-wash harvested shellfish at the conveyor station is currently allowed to flow across the ground surface and reenters Drakes Estero. Drakes Estero water used for the indoor single-oyster cultch tanks is heated to a temperature of 23 to 25 degrees Celsius (73 to 77 degrees Fahrenheit) and enriched with microalgae as a food source for the shellfish larvae. Water for the outdoor setting tanks is also heated and allowed to cool before re-entering Drakes Estero. Oysters in the setting tanks are fed by routing/circulating Drakes Estero water through the tanks on a continuous basis for several days. Because the original source of the water is Drakes Estero and the wastewater returning to Drakes Estero is relatively unchanged (with the exception of the small amount of microalgae).

Alternative B would include removal of the existing conveyor washing station and replace this facility with a new conveyor system and work platform that would include a sediment trap to filter water from the washing station before the water is allowed to reenter the Drakes Estero. Treatment of spray wash would be a beneficial effect on water quality discharge back to Drakes Estero. Sediments and fouling organisms would be allowed to settle at the bottom of the wastewater vault for periodic removal, and thus decrease the sediment loads entering Drakes Estero and local turbidity compared to the existing spraying system. This point-source discharge is not expected to impact water quality (Baltan 2006).

DBOC operations would continue to use several wastewater septic tanks and pumps at the onshore facilities, as well as the two underground drain fields located upslope from the operations facility, until the year 2022. The capacity of the wastewater tanks, pumps, and drain fields appears to be sufficient to handle the effluent originating from the operations center. Thus, the risk of discharges from a lack of capacity appears unlikely. Impacts on water quality could occur from wastewater entering Drakes Estero if the treatment facility were to fail. Furthermore, maintenance of the wastewater treatment system would likely require that storage tanks be pumped as well as underground lines being cleaned/replaced. These actions could result in leaks and spillages of wastewater, causing small levels of wastewater (fecal coliform) to enter Drakes Estero. These levels, however, would not be expected to cause significant water quality impacts, to the degree that shellfish become contaminated or recreational use of Drakes Estero temporarily ceases.

Vehicular traffic to and from the operations facility associated with the commercial shellfish operations is predicated on employee travel, distribution/delivery trucks, and visitors to the DBOC interpretations center. Vehicular use would continue under current conditions, resulting in oils and other pollutants entering Drakes Estero through nonpoint-source stormwater runoff originating from vehicles. NPS facilities would remain under this alternative.

As described above, alternative B would result in short-term minor adverse and long-term minor adverse impacts on water quality for another 10 years because this alternative would include temporary, localized impacts (affecting areas adjacent to culture beds) that would not have long-lasting effects on water quality (but would occur regularly) and would not alter natural water quality conditions. These temporary, localized impacts to water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to water quality in Drakes Estero. Impacts to water quality associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact water quality in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include the existing fire management plan, coastal watershed restoration projects in the Seashore (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), existing ranching operations, and moving the vault toilet out of the flood hazard area.

For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative B would result in a long-term minor adverse cumulative impact on water quality in Drakes Estero. Alternative B would contribute a noticeable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on water quality beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, this alternative would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative B would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Cultivated shellfish as filter feeders would remain in Drakes Estero under this alternative, offering localized long-term beneficial impacts on water quality by removing suspended solids, nutrients, and phytoplankton from the water column. Sediment disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity that would be mitigated by a floating silt screen. This alternative would include the replacement of between

1,700 and 2,500 posts in 2013 and between 380 and 750 posts in 2014 which also result in short-term adverse impacts on water quality as the sediment is disturbed. The use of pressure treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. The point-source discharges (washing station and setting tanks) under this alternative would continue, but no new point-source outputs would be introduced. Point-source discharges would include water from the washing station after sediments and fouling organisms are filtered from the sediment basin resulting in beneficial impacts; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point-source pollution from runoff associated with the onshore facilities is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the cumulative impact.

With regard to water quality, alternative B would satisfy the goals and objectives of NPS *Management Policies 2006* (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact water quality are the same as described under alternative B. The offshore SUP boundaries would be reduced by 186 acres; however, DBOC’s racks and bags would occupy generally the same area as under alternative B. Impacts due to the production limit of 500,000 pounds per year under alternative C would be similar as those described for the 600,000 pounds production limit under alternative B.

Under this alternative, cultivated shellfish would remain in Drakes Estero providing localized benefits to water quality by filtering and processing a portion of those pollutants entering the water from the watershed. As discussed in alternative A, however, the overriding influence affecting water quality is the ability of Drakes Estero to drain most of its water at low tide and replace that water during the next high tide cycle with upwelled oceanic water transporting a renewed supply of nutrients (Kozloff 1983; Morgan 2001). Many of the oysters are not full-sized adults with high filter rates, and most oysters are not in contact with the water column during low tide. Considering these factors, an analysis of the filtering capacity of DBOC oysters, similar to alternative B, determined that less than one percent of Drakes Estero would be filtered by oysters each tidal cycle under this alternative.

Impacts to water quality due to offshore operations would be the same as described under alternative B. Alternative C would continue the use of onshore buildings and operations with no appreciable difference compared to alternative B. Therefore, water quality impacts from onshore operations would be the same as those described under alternative B.

NPS facilities would remain under this alternative. Impacts on water quality from NPS facilities would be the same as described under alternatives A and B.

As described above, alternative C would result in short-term minor adverse and long-term minor adverse impacts on water quality for another 10 years because impacts would include temporary, localized impacts that would not have long-lasting effects on water quality (but would occur regularly) and would be in historical water quality conditions. These temporary, localized impacts to water quality would be slightly detectable (affecting areas adjacent to culture beds) but would not alter natural water quality conditions in the project area.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to water quality in Drakes Estero. Impacts to water quality associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact water quality in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include the existing fire management plan, coastal watershed restoration projects in the Seashore (Geomorphic Restoration Project and Drakes Estero Road Crossings Improvement Project), existing ranching operations, and moving the vault toilet out of the flood hazard area.

For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative C would result in a long-term minor adverse cumulative impact on water quality in Drakes Estero. Alternative C would contribute a noticeable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on water quality beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative C would result in short-term minor adverse as well as long-term minor adverse impacts on water quality for another 10 years. Alternative C would include activities causing intermittent disturbances to water quality that would result in recurring but not long-lasting effects on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) but would not alter natural water quality conditions in the project area. Alternative C would have recurring but not long-lasting effects on water quality. Cultivated shellfish would remain in Drakes Estero for another 10 years under this alternative, offering localized beneficial water filtering functions from the removal of suspended solids, nutrients, and phytoplankton from the water column. Impacts on water quality would include those described under alternative B. In particular, sediment

disturbances from offshore shellfish operations (bags/trays, boats, wading DBOC employees) would be locally temporary (pulsing) and would dissipate after each tide cycle, resulting in short-term minor adverse impacts on water quality. This alternative would include the replacement of between 1,700 and 2,500 posts in year 2013 and between 380 and 750 posts in 2014, which would also result in short-term adverse impacts on water quality due to sediment disturbance. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity, resulting in short-term adverse impacts on water quality. Standard BMPs would be employed during dredging such as the use of a floating silt screen. Point-source discharges would include discharging water from the washing station after marine sediments and fouling organisms are filtered and removed from the new sediment basin; no chemical contaminants would be discharged into Drakes Estero under this alternative. The amount of non-point source pollution from runoff at the onshore facility is currently very small (less than 3 acres of impervious surface in a watershed of several square miles). The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impacts.

With regard to water quality, alternative C would satisfy the goals and objectives of *NPS Management Policies 2006* (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact water quality are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact water quality include:

- Increased production limit
- New onshore development

Under alternative D, DBOC could produce up to 850,000 pounds of shellfish per year, which is a noteworthy increase of approximately 40 percent compared to alternative B (600,000 pounds per year) and a 70 percent increase compared to alternative C (500,000 pounds per year). Alternative D is not expected to increase the size or extent of the offshore racks. On the other hand, if more cultivated shellfish are placed in Drakes Estero, this alternative would provide a higher level of localized water quality benefits as the higher quantity of shellfish would be available to filter and process more pollutants from the water column compared to the other alternatives. The higher production rate may require more frequent boating trips to the offshore facilities for shellfish cultivation. This work would be in combination with boat trips to repair racks as discussed under alternative B, causing additional short-term sediment disturbances from boat hulls, boat propellers, worker pedestrian access, and management of bags/trays compared to the other alternatives; however, these sediment disturbances would dissipate daily

tidal flushing. Also, as indicated by DBOC (DBOC 2012b^{lvii}) floating culture is currently anchored on existing dilapidated racks and in areas immediately adjacent to existing rack culture. Under alternative D, all racks (once repaired) would likely be fully utilized for wire culture (DBOC 2012b^{lviii}), and floating culture comprised of concrete anchors and attached lines may be relocated to areas adjacent to racks using concrete anchors, etc. The continued risk of mariculture-related structures contributing to plastic debris in Drakes Estero would continue and would be similar to the impacts described in alternative B. Thus, impacts on water quality collectively from sediment disturbances caused by these offshore activities are expected to be slightly higher than those described for alternatives B and C.

Just as with alternatives A, B and C, the overriding influence affecting water quality is the ability of Drakes Estero to drain most of its water at low tide and replace that water during the next high tide cycle with upwelled oceanic water transporting a renewed supply of nutrients (Kozloff 1983; Morgan 2001). Cultivated shellfish would remain in Drakes Estero under alternative D providing localized benefits to water quality by filtering and processing a portion of those pollutants and nutrients entering Drakes Estero from oceanic inputs and runoff from the watershed. The amount of water filtered by DBOC oysters under alternative D would be slightly higher compared to alternatives B and C due to the higher production rate.

Onshore operations and water quality impacts would be nearly the same as those described under alternative B. One difference would be the replacement of the existing processing plant with a larger facility. This action is expected to cause temporary exposure of local soils during construction, potentially risking erosion and sediment transfer into Drakes Estero until construction is completed and soils are either stabilized on site or removed. Construction of the new building would be conducted using appropriate BMPs to reduce sedimentation. A site specific construction plan and BMPs would be required to reduce sediment loading from the construction site to Drakes Estero. Short-term minor adverse impacts on water quality may occur by increasing local turbidity levels and thus adversely affecting adjacent aquatic habitats for fish and shellfish. The building is not expected to increase impervious surface, affecting stormwater runoff pollution, because the building would be constructed on existing impervious area.

As described above, alternative D would result in short-term minor adverse and long-term minor adverse impacts on water quality for another 10 years because impacts would include temporary, localized impacts that would not have long-lasting effects on water quality (but would occur regularly) and would be in historical water quality conditions. These temporary, localized impacts to water quality would be slightly detectable (affecting areas adjacent to culture beds) but would not alter natural water quality conditions in the project area. However, this alternative could cause slightly higher rates of sediment disturbance in Drakes Estero, compared to alternatives B and C, due to more bag/tray management. Alternative D also would result in short-term minor adverse impacts on water quality during construction of new DBOC facilities because impacts would include temporary (lasting less than a year), localized impacts that would not have long-lasting effects on water quality.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to water quality in Drakes Estero. Impacts to water quality associated with conversion of the site to congressionally designated wilderness in 2022 would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact water quality in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include the existing fire management plan, coastal watershed restoration projects in the Seashore (Geomorphologic Restoration Project and Drakes Estero Road Crossings Improvement Project), existing ranching operations, and moving the vault toilet out of the flood hazard area.

For the same reasons discussed in the cumulative impact analysis for alternative A, the impact of these past, present, and reasonably foreseeable future actions would be long-term minor adverse. The impact of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative D would result in a long-term minor adverse cumulative impact on water quality in Drakes Estero. Alternative D would contribute a noticeable adverse increment to the cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on water quality beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative D would have short-term minor adverse as well long-term minor adverse impacts on water quality for 10 more years due to offshore and onshore activities associated with commercial shellfish operations in Drakes Estero. Alternative D would not be expected to exceed water quality standards, have long-lasting effects on water quality or impede the goals and objectives of NPS policies on water quality. These temporary, localized impacts on water quality would be slightly detectable (affecting areas adjacent to culture beds) and would not alter natural water quality conditions in the project area. Alternative D would have the highest population of cultivated shellfish occupying Drakes Estero. As a result, the localized water quality benefits from filter feeding bivalves would be greater compared to the other alternatives. The impacts associated with alternative D would be similar to those described under alternatives B and C. However, this alternative may cause slightly higher rates of sediment disturbance in Drakes Estero compared to alternatives B and C due to more frequent boat trips and bag/tray management. The use of pressure-treated lumber to repair existing offshore racks and to construct a new dock is not expected to introduce wood preservatives containing copper into the water because it is assumed that mitigating conditions such as the use of sealants would be employed as part of regulatory permit conditions. Dredging around the floating dock would be expected to create temporary disturbances to the water column from increased turbidity, resulting in short-term minor adverse impacts on water quality. Standard BMPs, such as the use of a floating silt screen, would be employed during dredging. Onshore discharge into Drakes Estero of pumped water serving the washing station and settling tanks would be filtered using the new sediment basin, resulting in beneficial impacts on water quality. In addition, onshore sediment may enter waters due to the construction of new facilities, although this action could be mitigated through a site-specific construction plan and the use of standard BMPs. Alternative D also would result in short-term minor adverse impacts on water quality during the construction of new DBOC facilities because impacts would include temporary (lasting less than a year), localized impacts that would not have long-lasting effects on

water quality. The cumulative impact would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.

With regard to water quality, alternative D would satisfy the goals and objectives of NPS *Management Policies 2006* (NPS 2006d) and would be consistent with the purpose of the CWA, which is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”

IMPACTS ON SOUNDSCAPES

LAWS AND POLICIES

The NPS Organic Act (16 USC section 1) establishes and authorizes NPS “to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” An important aspect of the natural communities that NPS is directed to preserve in the national park system is the natural soundscape, which enhances visitor experience and reduces disturbances of wildlife.

The Code of Federal Regulations recognizes concerns for preserving natural soundscapes; 36 CFR 2.12 (Audio Disturbances) restricts the use of certain types of power equipment in units of the park system and places sound level limitations on others. Noise levels that exceed 60 dBA at 50 feet from the source, noise that is unreasonable given the location or time of day, and noise that is not in keeping with the purpose for which the area was established are conditions that are usually inappropriate or excessive. Section 2.12(c) contains an exception allowing for the use of motorboats in areas where they are permitted. However, NPS does not allow the use of motorboats by the public in Drakes Estero because of its wilderness designation. Existing authorizations allow DBOC to use motorboats as part of its commercial shellfish operation.

NPS *Management Policies 2006*, section 4.9, “Soundscape Management,” requires that NPS “preserve, to the greatest extent possible, the natural soundscapes of parks.” Additionally, NPS “will restore to the natural condition wherever possible those park soundscapes that have become degraded by the unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts” (NPS 2006d).

Director’s Order 47: Soundscape Preservation and Noise Management was developed to emphasize NPS policies “that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources.” This Director’s Order also directs park managers to measure acoustic conditions, differentiate existing or proposed human-made sounds that are consistent with park purposes, set acoustic goals based on the sounds deemed consistent with the park purpose, and determine which noise sources are impacting the parks (NPS 2000).

Additionally, NPS *Management Policies 2006*, section 8.2.3, “Use of Motorized Equipment,” acknowledges that motorized equipment operating in national parks could adversely impact the park’s natural soundscape. To preserve the natural soundscape, park superintendents will manage when and where motorized equipment is used, evaluating effects on the natural soundscape against the natural ambient sound level (that which exists in the absence of human-induced sounds) (NPS 2006d).

METHODOLOGY

As described in chapter 3, the magnitude of noise is usually described by its sound pressure. Sound pressures described in decibels are often defined in terms of frequency-weighted scales. Sound levels measured using an A-weighted decibel scale are generally expressed as dBA. Throughout this section, all noise levels are expressed in dBA. A-weighting is based on human hearing capabilities. Comparative studies of vertebrate hearing suggest that dBA values are likely to overstate the perceived loudness of noise for all terrestrial vertebrates at Point Reyes. Dooling and Popper (2007) note that humans have better auditory sensitivity than most birds. Humans have better low frequency hearing than most terrestrial mammals that have been studied (Fay 1988). Mammals that are known to have better low frequency hearing than humans are baleen whales (Ketten 1994), elephants (Heffner and Heffner 1982; Poole et al. 1988), and kangaroo rats (Heffner and Masterton 1980); however, none of these mammals are found in the project area.

The impact analysis below is based on available measurements from in or adjacent to the project area as well as a review of reference sound levels available for similar pieces of equipment. As described in chapter 3, estimates of ambient and background noise are estimated using data collected at the PORE004 station during the Volpe (2011) study. The PORE004 station was located approximately 60 yards from the shore of Drakes Estero and 2 miles from the DBOC buildings. It is just outside but immediately adjacent to the general project area established for this EIS. High bluffs block the direct line from PORE004 to the DBOC processing facilities; the buildings are not in view, and the direct path for noise is blocked by terrain. Although some boat noise is audible at this site, the PORE004 site was not in an ideal location for measuring DBOC boat noise.

The DBOC equipment descriptions and frequencies of use are based on information provided by DBOC (DBOC [Lunny], pers. comm., 2011h). NPS did not obtain noise measurements of operational DBOC equipment in Drakes Estero. Data were provided by Environ International during the public comment period for the Draft EIS (Environ 2011), but these measurements are problematic to interpret and use. Environ did not follow pertinent standards and the measurement processes and the operating conditions of the equipment were not adequately described.² To address these concerns, the Environ measurements were compared with reports that document noise levels measured under specified conditions from comparable equipment.

Impacts on soundscapes are judged primarily by the contribution of human-caused sound to the natural soundscape, based on the assumptions developed in chapter 3, which describes the affected environment. Assumptions include the following:

- The reference ambient sound level is assumed to be 34 dBA, the median (L_{50}) summer daytime measurement at the PORE004 station (Volpe 2011). This level incorporates human-caused noise

² NPS requested clarifying information regarding the Environ measurements from DBOC in a letter dated April 6, 2012. Clarifying information was provided to NPS in DBOC's June 5, 2012 letter. This information was reviewed; however, it did not resolve concerns regarding measurement processes and description of operating conditions.

and overstates natural background conditions. However, it relates most directly to everyday experience and serves as a reasonable upper bound for the natural ambient sound level at most locations in Drakes Estero. Higher sound levels could be found at atypical locations close to noise sources, surf, or rapidly flowing water.

- The sound level exceeded 90 percent of time – the L_{90} – is used to approximate the background or residual sound level against which all identifiable sounds are heard (ANSI S12.9-1). On the eastern shore of Drakes Estero at the PORE044 station, the daytime L_{90} was 26 dBA in summer and winter, and this may be interpreted as a lower bound for natural ambient sound level.
- Variation of sound levels in time is greater than spatial variation. Volpe data from three undeveloped sites in Point Reyes National Seashore – in very different ecological settings – show that summer daytime L_{50} values range from 32 to 35 dBA, and summer daytime L_{90} values for the undeveloped sites range from 26 to 29 dBA.
- The noise energy produced by DBOC equipment is presented as a range, based on available reference levels and on data provided by Environ during the public comment period for the Draft EIS, and a survey of reports documenting noise levels from similar equipment. This information is discussed in chapter 3 and summarized in table 3-3.
- The duration of human-caused noise as a result of DBOC activities was estimated using information provided by DBOC as presented in table 3-3. At the onshore facilities, this includes a front end loader operating two to four hours a day and an oyster tumbler operating approximately two hours per day (DBOC [Lunny], pers. comm., 2011h). Small pneumatic drills are also used approximately two hours per day (DBOC [Lunny], pers. comm., 2011h). In the estero, boats operate approximately 8 hours per day, 6 days per week, making a total of 12 round trips per day (DBOC [Lunny], pers. comm., 2011h). According to DBOC, boats travel to a site, are shut off while DBOC staff work, and are turned back on for travel to the next site. DBOC estimates that the motors are running for about a quarter of the time that the boat is being used in Drakes Estero (DBOC [Lunny], pers. comm., 2011h), resulting in approximately 2 hours of boat noise per day. In terms of the total duration of noise exposure, an unknown factor is the extent to which the noise sources (both onshore and offshore) are operated simultaneously. This analysis assumes that four to eight hours of noise generation occurs each day, six days per week, resulting in 24 to 48 hours of DBOC noise generation each week. As described in Appendix I, an intensive review of 52 days of Volpe recordings taken at the PORE004 station revealed that the duration of unambiguous boat noise exceeded 2.5 hours in the reception range of microphone PORE004 on one day and in terms of all potential DBOC noise, 11 days exceeded 10 percent of the day (2.4 hours). However, these findings underestimate noise exposure in Drakes Estero for the following reasons: The PORE004 site was on the periphery of DBOC operations, and unambiguous boat noise events reflect boats that were close enough to be heard and recognized. Furthermore, prevailing winds caused the PORE004 station to be upwind from the DBOC noise sources for more than 30 percent of the daylight hours. Noise refracts away from the ground when it travels upwind, so the PORE004 site would have been ineffective in detecting DBOC noise from Drakes Estero under these conditions. In addition, high bluffs block the direct line from PORE004 to the DBOC processing facilities; the buildings are not in view, and the direct path for noise is blocked by terrain. For these reasons, the duration of human-caused noise used for the analysis in this section is based on information provided by DBOC, as it is a more accurate representation of the duration of DBOC noise-generating activities, both onshore and offshore.

- This analysis omits other noise sources associated with DBOC operations (such as radios, compressors, and vehicles) that could not be readily quantified. These sources have the potential to cause additive contributions to the noise levels associated with DBOC operations. The level of additional noise caused by additional sources is unknown, but because of the possibility of additional noise, the analysis presented below may underestimate the impact of DBOC-related noise to the soundscape in the project area.

Noise levels decrease with increasing distance from the source. For this analysis, the effects of spreading or divergence loss and atmospheric absorption were used to predict the attenuation of noise with distance. Spherical spreading losses are anticipated to be 20 dBA for every tenfold increase in distance, and approximately 6 dBA for every doubling of distance. Atmospheric absorption was calculated from the formulae presented in ISO 9613-1, using an air temperature of 59 degrees Fahrenheit and a relative humidity of 80 percent (climatological averages for Drakes Estero). This resulted in an absorption coefficient of about 1.7 dBA per mile. These assumptions regarding sound propagation will underestimate the area affected by noise when a near surface inversion layer exists, as on a calm summer day when the water is much colder than the air above it. Inversions are less likely to form as wind speeds increase. On windy days, the natural condition sound levels would be higher and the motorboat sound may dissipate more quickly upwind but would carry further downwind. According to weather conditions recorded at the closest weather station to the project area (the Point Reyes RCA Station) over the course of the years 2010-2011, approximately 68 percent of days experienced an average wind speed of less than 10 miles per hour (Western Regional Climate Center 2012).

Intensity Definitions

Intensity definitions for noise levels are rendered in terms of speech interference in order to interpret decibel values in relation to familiar, everyday experiences for park visitors and public stakeholders (EPA 1981). For example, the summer daytime L_{50} value was 34 dB, which translates to a quiet environment in which people could communicate at a normal voice level when separated by 37 feet. The summer and winter L_{90} was 26 dBA, which translates into opportunities to communicate at a normal voice level when separated by more than 90 feet. Intensity definitions based on functional consequences to human communication also serve as reasonable proxies for the magnitude of human-caused noise inference with animal behavior.

For short-term impacts, percentages are based on the percentage of time during a year (taking into consideration 24 hours a day) that human-made noise impacts the ambient soundscape. For long-term impacts, percentages are based on the percentage of time during the 10-year SUP term (taking into consideration 24 hours a day) that human-made noise impacts the ambient soundscape. A 24-hour day is used because the soundscape exists and is impacted independent from wildlife or human experiences. To simplify the analysis, nighttime hours are treated the same as daytime hours. As nocturnal sound levels are lower, noise impacts at night would be greater. However, most DBOC operations occur during the day. The importance of daily and seasonal patterns of noise exposure on wildlife and humans is addressed elsewhere, in the discussion of “Impacts on Wildlife and Wildlife Habitat” and “Impacts on Visitor Experience and Recreation.”

Negligible:	The impact is not detectable or measurable.
Minor:	Human-caused noise would be at a level (less than 35 dBA) that enables normal voice conversation at distances exceeding 32 feet, and/or the natural soundscape is interfered with less than 5 percent of the time.
Moderate:	Human-caused noise would be at a level that enables normal voice communication at distances greater than 16 feet (less than 41 dBA) and less than 32 feet (greater than 35 dBA), and/or the natural soundscape is interfered with 5 to 10 percent of the time.
Major:	Human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered with more than 10 percent of the time.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972). Cessation of DBOC-related contributions of noise to the natural soundscape would remove the primary source of human-caused noise in the project area. Instead of needing to raise their voices or even shout to be heard, people would be able to communicate with each other in a normal speaking voice at distances of 40 feet or more. Sounds associated with kayakers would persist, as discussed under cumulative impacts.

Impacts on wildlife due to alterations in the natural soundscape that have resulted from the commercial shellfish operation would be eliminated. Acoustical ecology in Drakes Estero would be restored to a condition primarily driven by natural processes. Just as people would be able to speak to each other more easily, interference with auditory cues (such as those used for hunting, predator awareness, sexual communication, defense of territory, and habitat quality assessment by wildlife) would no longer be interfered with due to noise emanating from the commercial shellfish operations. Flushing of birds and harbor seals due to human-caused sounds would be greatly reduced. Any continued human-caused noise that may impact wildlife would be related to recreational boaters using kayaks or other nonmotorized watercraft (as discussed under the cumulative impact section below), as well as infrequent use of motorboats by NPS staff for management purposes. Use of motorboats by NPS is strictly regulated through the Wilderness Act minimum requirement process. Visitor use of motorboats in Drakes Estero is prohibited, and Drakes Estero would continue to be closed to the public boating during harbor seal pupping season.

In addition to benefiting wildlife, restoration of the natural soundscape would enhance wilderness values by reducing the evidence of human activity in congressionally designated potential wilderness (which would be converted to congressionally designated wilderness under this alternative), and visitors seeking to experience the wilderness characteristics of Drakes Estero would have an improved experience.

Removal of DBOC property and structures may require the temporary use of heavy vehicles onshore and motorized use offshore, which typically emit sound levels between 60 and 80 dBA, depending upon which equipment is necessary (FHWA 2006). Use of such equipment is expected to be between two to three months, assuming that work would take place for 10 weeks, five days per week, 8 hours per day. This schedule would result in approximately 400 hours of noise interfering with the soundscape. In other words, the natural soundscape would be interfered with for less than 5 percent of that year. In the vicinity of this heavy equipment, vocal communication would be difficult unless visitors were very close to each other. Site restoration efforts would cause a temporary impact on the natural soundscape while these activities occurred. However, the long-term impact would be beneficial due to the cessation of DBOC operations and subsequent site restoration. Noise generated by human activities on the ground in and near Drakes Estero would be reduced dramatically.

For these reasons, alternative A would result in short-term minor adverse impacts and long-term beneficial impacts on soundscapes. Cessation of the commercial shellfish operation under Alternative A would result in long-term beneficial impacts on soundscapes due to the elimination of human-caused noise associated with the commercial shellfish operation, which would result in the restoration of a substantially more natural soundscape. The noise associated with the use of heavy machinery and motorized boats to remove DBOC structures and property would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, this impact would interfere with the natural soundscape for less than 5 percent of one year; therefore, alternative A would result in short-term minor adverse impacts on soundscapes.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact soundscapes in the project area. These actions include kayak use, planning and management activities, and other sources of human-caused noise.

Planning and management activities may call for actions that require motorboat use in Drakes Estero for research or administrative purposes. Motorboat use in Drakes Estero would continue to be subject to the minimum requirement because of the wilderness designation. Therefore, research activities in Drakes Estero are not expected to result in long-term alteration in the natural soundscape. Any noticeable contributions of human-caused noise would be temporary. This action has the potential for short-term minor adverse impacts on soundscapes.

Use of Drakes Estero by kayakers would continue to take place and may even increase following the removal of DBOC facilities. Noise produced by kayakers is limited to sounds such as talking, laughing, and shouting. Other sources of human-caused noise include airplane overflights and vehicles on Sir Francis Drake Blvd. The Volpe report estimates that the change in median sound levels due to all aircraft at the PORE004 site is small: 1.4 dBA in summer and 1.7 dBA in winter. According to recent data collection, overflights account for 13 percent (in the summer) to 17.6 percent (in the winter) of audible sounds at the PORE004 site located on the bluff of Drakes Estero (Volpe 2011). These uses, even if increased, would contribute a long-term minor adverse impact on soundscapes.

The impacts of these past, present, and reasonably foreseeable future actions would be short-term minor to moderate adverse and long-term minor adverse. The impacts of these past, present, and reasonably foreseeable future actions, combined with the short-term minor adverse and long-term beneficial impacts of alternative A would result in a long-term beneficial cumulative impact on soundscapes. Alternative A would contribute an appreciable beneficial increment to the cumulative impact.

Conclusion

Alternative A would result in long-term beneficial impacts due to the elimination of human-caused noise levels associated with the commercial shellfish operation. The noise associated with the use of heavy machinery and motorized boats to remove DBOC structures and property would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, this impact would interfere with the natural soundscape for less than 5 percent of one year; therefore, alternative A would result in short-term minor adverse impacts on soundscapes. The cumulative impact would be long-term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.

With regard to soundscapes, alternative A would further the goals for soundscape management as set forth in relevant law and policy. *NPS Management Policies 2006* and *Director's Order 47: Soundscape Preservation and Noise Management* direct NPS managers to preserve and restore the natural soundscape, where possible.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would impact soundscapes include use of noise-generating equipment at the shore facility and outboard boat traffic in Drakes Estero. At the end of the 10 year extension, the noise impacts described under Alternative A would ensue as the site is restored.

At the onshore facilities, mechanized equipment would continue to generate noise. This equipment includes a front end loader operating two to four hours a day and an oyster tumbler operating approximately two hours per day (DBOC [Lunny], pers. comm., 2011h). Small pneumatic drills are also used approximately two hours per day (DBOC [Lunny], pers. comm., 2011h).

The offshore racks and bags are accessed via motorboat. During a February 16, 2011 site visit, DBOC staff advised NPS that DBOC currently operates two motorboats in Drakes Estero: one is 16 feet long with a 20-horsepower 4-stroke engine, while the other is 20 feet long with a 40-horsepower 4-stroke engine. Combined, these boats operate approximately 8 hours per day, 6 days per week, making a total of 12 round trips per day (DBOC [Lunny], pers. comm., 2011h). According to DBOC, boats travel to a site, are shut off while DBOC staff work, and are turned back on for travel to the next site. DBOC estimates that the motors are running for about a quarter of the time that the boat is being used in Drakes Estero (DBOC [Lunny], pers. comm., 2011h). In its June 5, 2012 response to NPS's request for additional

information, DBOC revised its description of boat use. The most noteworthy difference is that DBOC now uses three boats. DBOC did not provide a size or engine horsepower for the third boat. Otherwise, DBOC notes that the description above represents typical working conditions; however, DBOC also noted that, albeit unusual, all three boats may be in operation all day and that some weeks may require that boats be used all 7 days. DBOC also noted that on some days, no boats are in operation. DBOC must operate around variable demands, including tides, weather, day length, planting season, and high demand occasions (DBOC 2012b^{lix}). Under alternative B, it is assumed that boat operations will continue at levels similar to these.

The range of operational noise levels from table 3-3 can be combined with noise propagation formulae to predict the spatial footprint of each noise source in the absence of any barriers created by terrain. The following table documents the predicted distance each noise source (using both upper and lower bounds for the range of operational noise levels discussed in chapter 3) would travel before its level would equal the ambient sound level (34 dBA) and the background sound level (26 dBA).

TABLE 4-2. SPATIAL FOOTPRINT OF DBOC-GENERATED NOISE

Equipment	Lower bound of operational noise level at 50 feet	Distance at which lower bound noise decreases to the L ₅₀ of 34 dBA	Distance at which lower bound noise decreases to the L ₉₀ of 26 dBA	Upper bound* of operational noise level at 50 feet	Distance at which upper bound* noise decreases to the L ₅₀ of 34 dBA	Distance at which upper bound* noise decreases to the L ₉₀ of 26 dBA
	dBA	feet	feet	dBA	feet	feet
Front End Loader	67	2,071	4,711	73	3,863	8,238
Pneumatic Drill	67	2,071	4,711	80	7,537	14,556
Oyster Tumbler	50	312	771	75	4,711	9,786
Motorboat	62	1,203	2,842	74	4,269	8,987

* These operational noises levels are the upper bound of the range used for the impact analysis; however, these noise levels do not represent the maximum possible noise levels produced by this equipment. Rather, these noise levels are intended to be realistic operational noise levels based on the literature cited.

Another way of considering how noise generated by DBOC operations would continue to impact the natural soundscape under this alternative is to select a few uniform benchmark sound levels associated with a particular functional consequence and compare the distances at which each noise-generating piece of equipment is expected to reach the associated sound level. The table below (table 4-3) summarizes at what distance each item meets the following criteria:

- Interferes with interpretive presentations or group leader communication (raised voice communication at 32 feet) (EPA 1981)
- Normal voice communication is degraded when visitors are separated by 17 feet or more (EPA 1981)
- Background sound levels equals desired levels for classrooms, bedrooms, auditoria, and other indoor spaces where quiet and good listening conditions are important (ANSI 2008)
- Noise equals the background or residual sound level (L₉₀) (Volpe 2011; ANSI 1988).

TABLE 4-3. FUNCTIONAL CONSEQUENCES IN THE SPATIAL FOOTPRINT OF DBOC-GENERATED NOISE

Functional Consequence	Interferes with interpretive presentations or group leader communication (raised voice communication at approximately 32 feet).*	Normal voice communication is degraded when visitors are separated by approximately 17 feet or more.*	Background sound levels equals desired levels for classrooms, bedrooms, auditoria, and other indoor spaces where quiet and good listening conditions are important.†	Noise equals the background or residual sound level (L ₉₀).‡
Received noise level (dBA)	52	41	35	26
Front End Loader: Lower bound distance (feet)	279	964	1,860	4,711
Front End Loader: Upper bound distance (feet)	551	1,860	3,491	8,238
Oyster Tumbler: Lower bound distance (feet)	40	140	279	771
Oyster Tumbler: Upper bound distance (feet)	690	2,303	4,269	9,786
Pneumatic Drill: Lower bound distance (feet)	279	964	1,860	4,711
Pneumatic Drill: Upper bound distance (feet)	1,203	3,863	6,884	14,556
Motor boat: Lower bound distance (feet)	157	551	1,077	2,842
Motor boat: Upper bound distance (feet)	616	2,071	3,863	8,987

Sources: *EPA 1981, †ANSI 2008, ‡Volpe 2011; ANSI 1988

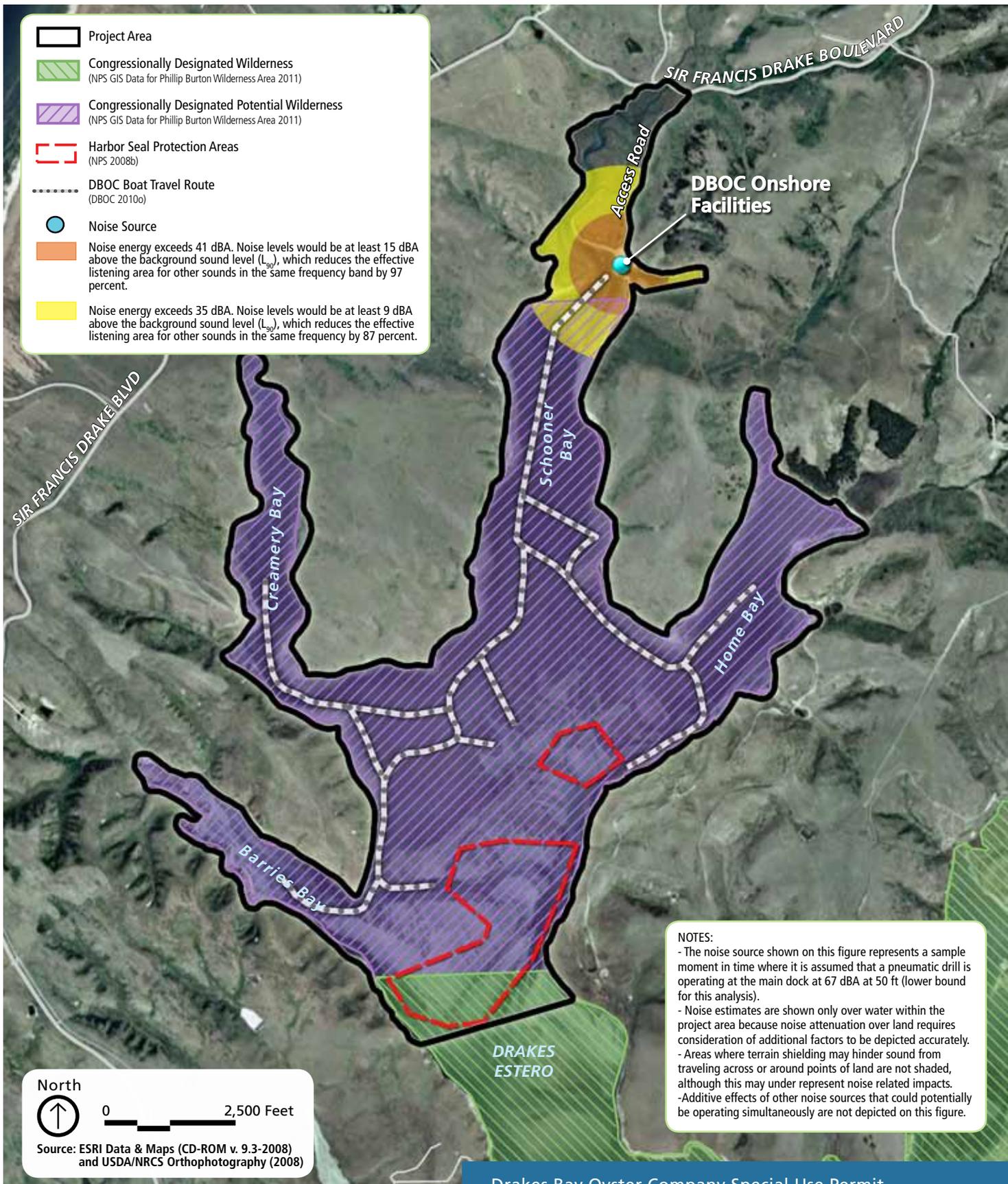
Several of these noise projection scenarios extend more than a mile (i.e., 5,280 feet), and a few approach or exceed two miles (e.g., 10,560 feet). The distance from the DBOC shore facilities to the potential wilderness boundary is 670 feet. The only scenario that does not project noise into wilderness is the lower bound of the oyster tumbler compared against the L₅₀ of the environment.

Figures 4-1 and 4-2 maps the spread of noise from the shore station, assuming a 67 dBA noise source at the lower bound (figure 4-1) and 80 dBA at the upper bound (figure 4-2), respectively. Again, it should be noted that the terms upper bound and lower bound refer to the range of operational noise levels assumed in this analysis; the upper bound represented does not necessarily represent the maximum noise level that could be produced by each piece of equipment. These figures ignore the spread of noise on land. Two noise contour levels were selected for this map: 41 dBA and 35 dBA. The first (orange) represents the area receiving noise energy that exceeds 41 dBA, which is 15 dBA above the background sound level (L_{90}). In this contour, noise dominates the acoustical environment and reduces the effective listening area for other sounds in the same frequency band by 97 percent. The outer contour (yellow) represents the area in which the received noise level exceeds 35 dBA. In this contour, noise exceeds the background sound (L_{90}) level by 9 dBA, reducing the effective listening area for other sounds occupying the same frequency band will be reduced by 87 percent.

Figures 4-3 and 4-4 both depict four examples to show how noise would spread from a boat at different locations in Drakes Estero. As above, these figures show the point at which sound would be expected to exceed 41 dBA and 35 dBA, respectively, at a moment in time. Under the boat operating conditions described earlier, intermittent motorboat travel impacts the natural soundscape for two hours a day. Kayakers that are in 550 feet of cruising motorboat would experience degraded normal voice communication when separated by 17 feet or more due to noise levels being greater than 41 dBA using the lower bound of anticipated noise generation. Motorboat noise would be audible in large areas of Drakes Estero when a DBOC boat is underway.

The tables above document the area around each individual noise source that would experience various levels of noise exposure. When more than one noise source is operating at the same time, noise exposures would be higher. In terms of the total duration of noise exposure, an unknown factor is the extent to which the noise sources are operated simultaneously. This analysis assumes that four to eight hours of noise generation occurs each day, six days per week. By this assumption, 24 to 48 hours of noise generation occur each week. In other words, DBOC contributes human-caused noise to the project area soundscape approximately 14 to 29 percent of each week, which translates to approximately 14 to 29 percent of the 10 year permit.

Transiting motorboats and onshore sources of noise would project noise audible to park visitors thousands of feet under the most conducive weather conditions. For portions of Drakes Estero that have an unobstructed view of the processing facility, some noise from the shore operations may be audible at distances exceeding 2.5 miles. Although additional sounds such as radios and other vehicles are not quantified, they may contribute to the noise emanating from the DBOC onshore site as well as from boats (where radios may be taken on board).



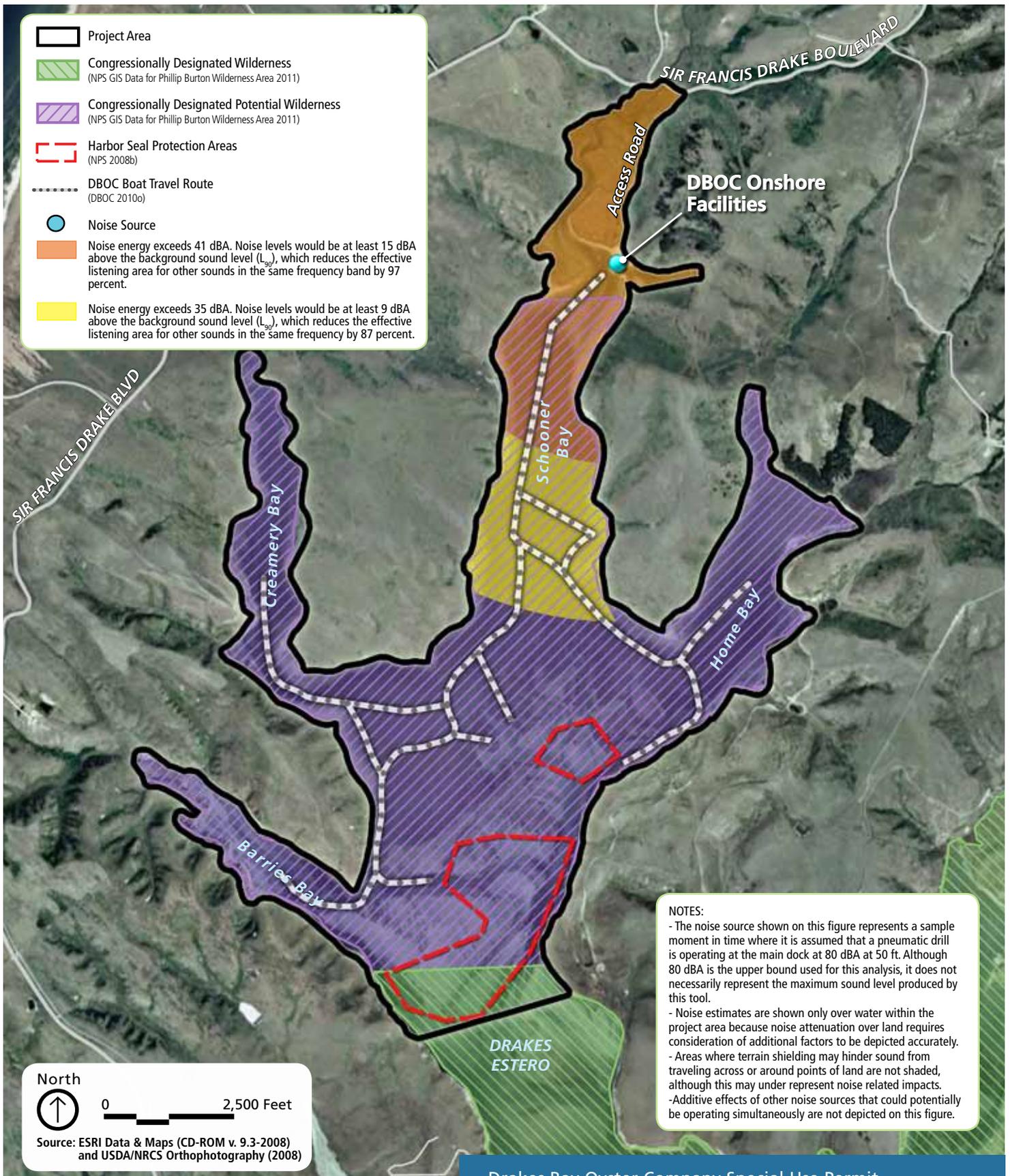
Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

FIGURE 4-1
DBOC Noise Generation - Onshore Facilities (Lower Bound)



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore



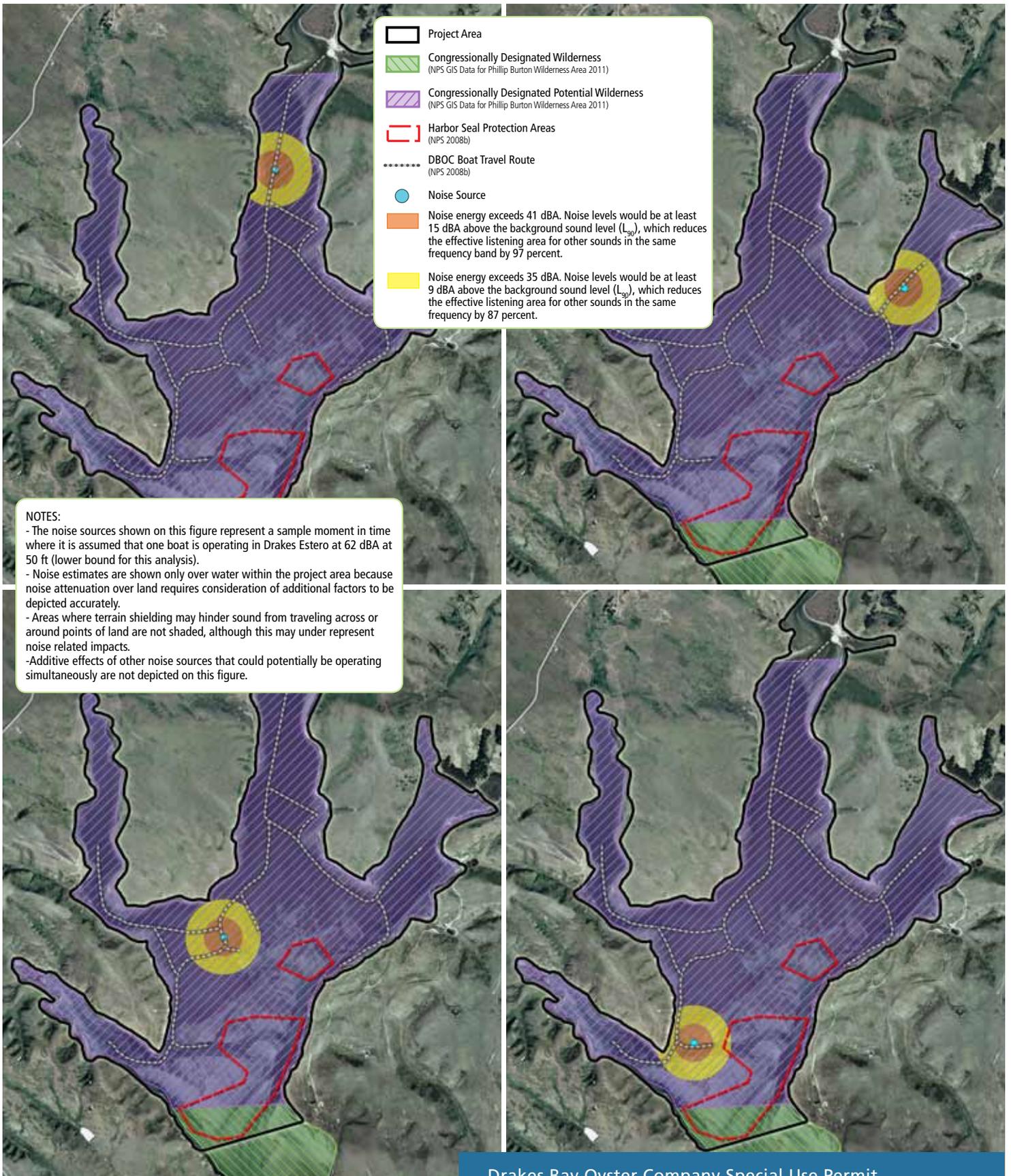
Drakes Bay Oyster Company Special Use Permit
Environmental Impact Statement

FIGURE 4-2
DBOC Noise Generation - Onshore Facilities (Upper Bound)



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore



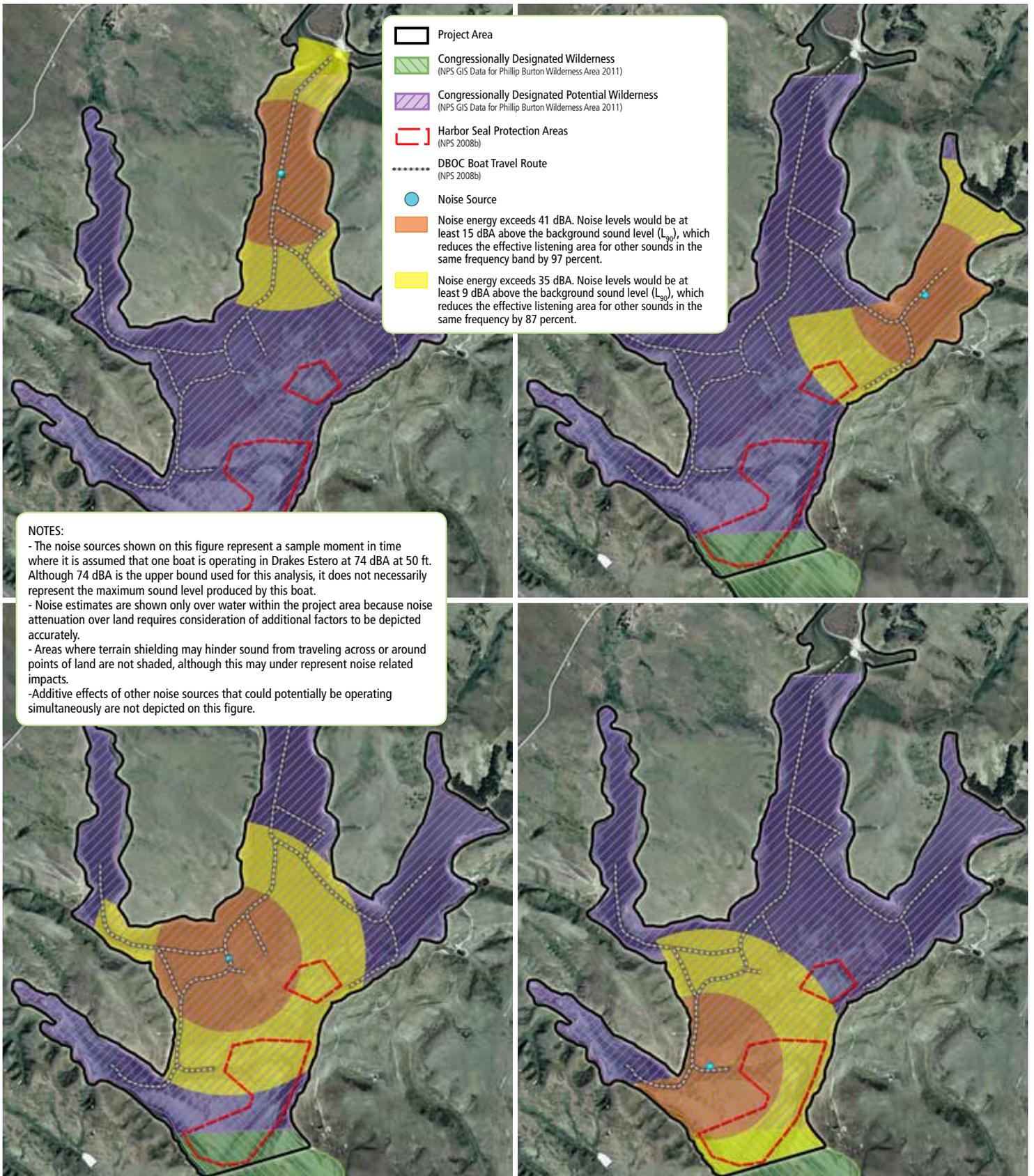
Drakes Bay Oyster Company Special Use Permit
Environmental Impact Statement



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

FIGURE 4-3
DBOC Noise Generation - Boat Operations (Lower Bound)



Drakes Bay Oyster Company Special Use Permit
Environmental Impact Statement



National Park Service
U.S. Department of the Interior

Point Reyes National Seashore

FIGURE 4-4
DBOC Noise Generation - Boat Operations (Upper Bound)

Contribution of human-caused noise to the natural soundscape has the potential to impact use of the project area by wildlife as well as visitors. It also would impact the wilderness character of Drakes Estero. Wilderness areas are valuable for their untrammelled, natural, and undeveloped characteristics as well as for the opportunity for solitude and a primitive or unconfined form of recreation (as described in more detail in the wilderness impact topic). The noise from DBOC operations detracts from these values. Onshore operations are approximately 670 feet north of the northern boundary of congressionally designated potential wilderness in Drakes Estero, and all quantified mechanized equipment in use at the processing station have the potential to project noticeable sounds in the wilderness area at the upper bound of possible noise emissions. The sounds serve as evidence of human intrusion on the natural landscape and disrupt opportunities for solitude. During public scoping, some commenters described the noise generated by DBOC as unpleasant. The percent time that the soundscape is impacted by shellfish operation noise (14 to 29 percent) is based on a 24 hour day; noise would impact a much larger percentage of daytime hours. Visitors are allowed to use the kayak parking lot from 6 a.m. to 12 midnight daily, and noise is predicted to be present 19 to 38 percent of time that the site is open to visitor use.

Relatively high noise levels in the project area also would have impacts on wildlife and wildlife habitat. As mentioned previously, the A-rated decibel scale reflects the frequency range to which the human ear is most sensitive (1 to 5 kHz). The hearing ranges of harbor seals and birds are similar. Harbor seals have a high range of sound sensitivity in water (1 to 180 kHz); however, in the air, harbor seal hearing is similar to that of humans (1 to 22.5 kHz), although still sensitive through a greater range of frequencies (Ridgway 1972). Birdsong also generally falls into this range (Barber, Crooks, and Fristrup 2010). Therefore, although each species perceives noise differently, the dBA scale is a reasonable representation of sound pressure emitted by noise generators and the level of disturbance that can be expected.

Wildlife can be very sensitive to sound, as animals often depend on auditory cues for hunting, predator awareness, sexual communication, defense of territory, and habitat quality assessment (Barber, Crooks, and Fristrup 2010). Negative population-level, behavioral, and habitat-use consequences of higher ambient sound levels from human voices, along with sound events associated with human activities (motorists, hikers), have been observed in many species (Frid and Dill 2002; Habib, Bayne, and Boutin 2007). Human activities can disturb harbor seals at haul-out sites, causing changes in harbor seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011). Under alternative B, DBOC operations would continue to cause disturbances related to impacts on the soundscape in the project area. Similar to visitor use, the overall soundscape percent of time impacted understates impacts to diurnal animals (i.e., animals that are active during the day).

Additional proposed actions have the potential to temporarily contribute to alterations in the natural soundscape. DBOC proposes to repair/replace 50 racks in 2013 and 25 racks in 2014. Although DBOC has not indicated whether or not this would result in additional boat use in Drakes Estero, this analysis assumes that the existing shellfish planting and harvest would occur during the period when racks are under repair, and there would be a short-term increase in boat operations in Drakes Estero to support repair activities. This would likely cause a temporary increase in the duration and spatial dispersion of noise generation in Drakes Estero. Repair and replacement may require more time than required for removal but is assumed to result in interference with the natural soundscape for less than 10 percent of each year (2013 and 2014, respectively). Demolition of the damaged main dock and construction of the proposed dock would require the temporary use (less than one month assuming six days per week, 8

hours per day) of heavy vehicles, which typically emit sound levels between 60 and 80 dBA, depending on which equipment is necessary (FHWA 2006). Demolition would interfere with the natural soundscape approximately 2 percent of the year.

Based on the information above, issuance of a 10-year SUP under alternative B would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the 10-year permit. Additionally, the noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, temporary impacts (including both rack repair/replacement and dock reconstruction) would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative B would result in short-term minor to moderate adverse impacts on soundscapes.

Upon expiration of the SUP in 2022, there would be a short-term minor impact during removal and restoration of the shore station habitat, as described in Alternative A. After restoration, noise due to human activities in and around Drakes Estero would decrease dramatically.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact soundscapes in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include kayak use, planning and management activities, and human-caused noise (other than DBOC), as described under alternative A. The impacts of these past, present and reasonably foreseeable future actions would be long-term minor adverse. The impacts of these past, present, and reasonably foreseeable future actions, when combined with the short-term minor to moderate and long-term major adverse impacts of alternative B would result in a long-term major adverse cumulative impact on soundscapes. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Due to discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts to soundscapes beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, alternative B would result in long-term major adverse impacts on the natural soundscape from continued DBOC operations because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the time. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would

be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative B would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.

With regard to soundscapes, alternative B would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS *Management Policies 2006* (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative B would include continued impacts on the natural soundscape from DBOC activities. This aspect of Alternative B would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise far in excess of 60 dBA at 50 feet. In addition to DBOC trucks and processing station equipment, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for rare use by NPS for administration of the wilderness in accordance with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under “Impacts on Wilderness.”

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact soundscapes are very similar to those described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC’s racks and bags would occupy the same space as under alternative B. Noise is predicted to be present in Drakes Estero 14 to 29 percent of the 10 year permit, at the same levels as Alternative B.

Based on the information above, issuance of a 10-year SUP under alternative C would result in major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the 10-year permit. Additionally, the noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, this impact would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative C would result in short-term minor to major adverse impacts on soundscapes.

Upon expiration of the SUP in 2022, DBOC operations would cease and NPS would convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. These actions would result in changes in impacts to soundscapes in the project area. The man-made noise associated with the offshore and onshore operations of DBOC would cease and at that point in time, impacts to soundscapes would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact soundscapes in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include kayak use, planning and management activities, and sources of human-caused noise (other than DBOC), as described under alternative A. The impacts of these past, present and reasonably foreseeable future actions would be long-term minor adverse. The impacts of these past, present, and reasonably foreseeable future actions, when combined with the short-term minor to moderate and long-term major adverse impacts of alternative C, would result in a long-term major adverse cumulative impact on soundscapes. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on soundscapes beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, issuance of a 10-year SUP under alternative C would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered with more than 10 percent of the 10-year permit. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of the dock facilities as well as the repair and replacement of the racks in Drakes Estero. The noise associated with the use of heavy machinery and motorized boats to demolish and reconstruct the dock facilities and replace and repair the racks would be at a level that would cause vocal communication to be difficult at a distance of less than 16 feet. However, the impacts associated with these activities would interfere with the natural soundscape for less than 10 percent of each year; therefore, alternative C would result in short-term minor to moderate adverse impacts on soundscapes. The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

With regard to soundscapes, alternative C would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS *Management Policies 2006* (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative C would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative C would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally by NPS for administration of the wilderness in accordance with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under “Impacts on Wilderness.”

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for continued commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact soundscapes are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact soundscapes include:

- Increased production limit
- New onshore development

Under alternative D, impacts on soundscapes have the potential to be greater than under alternatives B and C. Under alternative D, DBOC could produce up to 850,000 pounds of shellfish per year on average, compared with Alternatives B (600,000 pounds per year on average) and C (500,000 pounds per year on average). This may result in increased operation of the noise-generating equipment described under alternative B, increasing the duration of noise impacts to Drakes Estero; however, during additional design phases of the new onshore development under alternative D, NPS would work with DBOC to ensure that onshore sound-generating equipment would be housed in new buildings constructed or otherwise enclosed to the extent practicable. Due to the lack of specifics available for the proposed improvements, noise levels during operation are assumed to be the same under this alternative as under alternatives B and C, but could potentially be lessened if onshore noise-generating equipment was housed in new buildings, should they be constructed.

Under alternative D, the intensity of temporary impacts described under alternative B would be greater under alternative D due to the more extensive development proposed at the onshore site. Although the final site design is uncertain, there would be some level of demolition of existing structures and construction of new structures in the onshore permit boundaries. The activities associated with this development include onshore use of heavy machinery that typically emit sound levels between 60 and 80 dBA, depending upon which equipment is necessary (FHWA 2006). Activities associated with demolition and construction are assumed to take place over several months, assuming six days per week, 8 hours per day. Due to the level of effort likely required for construction of the new facilities, as currently proposed, this analysis assumes that at least 6 months would be required for demolition and construction. This would interfere with the natural soundscape for more than 10 percent of a year.

Based on the information above, issuance of a 10-year SUP under alternative D would result in major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the 10 year permit. Additionally, alternative D would also result in short-term major adverse impacts on the natural soundscape due to the use of heavy machinery during development of additional onshore facilities because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the year during which construction would take place.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to soundscapes in Drakes Estero. The man-made noise associated with the offshore and onshore operations of DBOC would cease, and impacts to soundscapes would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact soundscapes in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include kayak use, planning and management activities, and sources of human-caused noise (other than DBOC), as described under alternative A. The impacts of these past, present and reasonably foreseeable future actions would be long-term minor adverse. The impacts of these past, present, and reasonably foreseeable future actions, when combined with the short-term and long-term major adverse impacts of alternative D, would result in a long-term major adverse cumulative impact on soundscapes. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of onshore facilities, cumulative impacts on soundscapes beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A.

Conclusion

Overall, issuance of a 10-year SUP under alternative D would result in long-term major adverse impacts on soundscapes for the additional 10 years of operations, because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered with more than 10 percent of the time. Additionally, the soundscape would be impacted temporarily by demolition and reconstruction of onshore facilities as well as the repair and replacement of racks in Drakes Estero. Alternative D would also result in short-term major adverse impacts on the natural soundscape due to the use of heavy machinery during development of additional onshore facilities because human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape would be interfered with more than 10 percent of the year during which onshore construction would take place. The cumulative impact would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impact.

With regard to soundscapes, alternative D would not further the goals for soundscape management as set forth in relevant law and policy. For instance, NPS *Management Policies 2006* (NPS 2006d) directs park managers to take steps to restore and maintain natural soundscapes, whereas alternative D would include continued impacts on the natural soundscape from DBOC activities. This aspect of alternative D would also be inconsistent with 36 CFR 2.12 because it would allow DBOC to continue to use several mechanical tools that emit noise substantially in excess of 60 dBA at 50 feet. In addition to the DBOC trucks, pneumatic drill, and oyster tumbler operating onshore, DBOC would continue to operate its motorboats in potential wilderness, where motorboats are not allowed (except for those used occasionally

by NPS for administration of the wilderness in accordance with a minimum requirements analysis). Contributions of human-caused noise to the natural soundscape are also a detriment to wilderness values, as described in more detail under “Impacts on Wilderness.”

IMPACTS ON WILDERNESS

LAWS AND POLICIES

The Wilderness Act was passed in 1964. The Act established the National Wilderness Preservation System (NWPS) to permanently protect some of the most natural and undisturbed places in the U.S. and to serve as the guiding legislation for all wilderness areas “in order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas in the U.S. and its possessions, leaving no lands designated for preservation and protection in their natural condition” (PL 88-577, section 2a). Through this act, Congress announced its intent to preserve and protect wilderness areas in their natural condition.

The NWPS is a nationwide system of wilderness areas. This system currently contains over 700 wilderness areas in 44 of the country’s 50 states, and comprises over 107 million acres, ranging from the Aleutian Islands Wilderness in Alaska to the Death Valley Wilderness in Nevada and the Shenandoah Wilderness in Virginia (Wilderness.net 2011).

In 1976, Congress established more than 33,000 acres of wilderness in the Seashore (PL 94-544 and 94-567). This area is known as the Phillip Burton Wilderness Area (PL 99-68). The Phillip Burton Wilderness Area is unique in that it is the only wilderness area between Canada and Mexico that includes marine waters (wilderness.net 2011). Of the 33,000 acres, 25,370 were designated as wilderness and 8,003 acres, including the entirety of Drakes Estero, were designated as *potential* wilderness. Potential wilderness refers to areas where temporary nonconforming uses preclude immediate congressional wilderness designation. The only nonconforming use in Drakes Estero is DBOC’s commercial shellfish operation. PL 94-567 created an administrative mechanism (section 3) allowing NPS to convert the potential wilderness areas in Drakes Estero to full wilderness status once this nonconforming use is removed. When the commercial shellfish operations cease, the potential wilderness will convert to full wilderness status upon publication by NPS of a notice in the Federal Register announcing the cessation of the nonconforming use.

Section 4(c) of the Wilderness Act identifies prohibited uses, otherwise known as nonconforming uses, in wilderness. Nonconforming uses include a prohibition on commercial enterprises, mechanized equipment such as motorboats, and use of manmade structures. DBOC’s commercial shellfish operation, and its associated use of mechanized equipment and manmade infrastructure in Drakes Estero, constitutes a nonconforming use of wilderness.

With regard to nonconforming uses in potential wilderness in the Seashore, the House Committee Report accompanying the 1976 law stated:

“As is well established, it is the intention that those lands and waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status. (H. Rep. No. 94-160, September 24, 1976)”

In 2004, the Solicitor’s Office issued an opinion regarding the timing of the conversion of Drakes Estero from potential to congressionally designated wilderness status. Based on a review of the 1976 wilderness legislation, its legislative history, and the expiration date of the RUO, the Solicitor’s Office concluded that NPS lacked the authority to issue a permit for commercial shellfish operation beyond November 30, 2012 (DOI 2004). At that time, NPS notified CDFG of this information (NPS 2004d^k), and CDFG notified JOC (CDFG 2004a^{li}). The earliest date that the nonconforming use could be removed, thus allowing conversion to congressionally designated wilderness status, is November 30, 2012. Section 124 now provides discretionary authority for the Secretary to authorize DBOC’s nonconforming use for a period of 10 years, until November 30, 2022.

NPS *Management Policies 2006* requires that the potential wilderness be managed as wilderness to the extent that the existing nonconforming use allows (NPS 2006d). In addition, NPS *Management Policies 2006* states that NPS will engage the public as it determines the most appropriate means for removing from potential wilderness the nonconforming conditions that preclude wilderness designation (NPS 2006d, section 6.3.1). To this end, NPS *Management Policies 2006* requires that proposals having the potential to impact wilderness resources be evaluated in accordance with NPS procedures for implementing NEPA, and that NPS take into account the four essential qualities of wilderness, as outlined below (NPS 2006d, section 6.3.4.3).

Any action proposed to take place in wilderness related to research or park management is subject to a minimum requirement analysis as described in the Minimum Requirements Decision Guide (developed by the interagency Arthur Carhart National Wilderness Training Center; wilderness.net 2011) and NPS *Management Policies 2006* (NPS 2006d, section 6.3.5). This concept is applied as a two-step process that determines (1) whether or not the proposed action is appropriate or necessary for administration of the area as wilderness and does not cause significant impact on wilderness resources and character, in accordance with the Wilderness Act, and (2) the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized (NPS 2006d). DBOC operations are exempted from this analysis.

METHODOLOGY

The Interagency Wilderness Character Monitoring Team, which represents the Bureau of Land Management, USFWS, NPS, U.S. Geological Survey, and U.S. Forest Service, offers an interagency strategy to monitor trends in wilderness character across the National Wilderness Preservation System in the handbook *Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character across the National Wilderness Preservation System* (Landres et al. 2008). Based on the statutory language of the Wilderness Act, the interagency team identified four qualities of wilderness character that should be used in wilderness planning, stewardship, and monitoring:

- **Untrammeled**—Wilderness is essentially unhindered and free from modern human control or manipulation
- **Natural**—Wilderness ecological systems are substantially free from the effects of modern civilization
- **Undeveloped**—Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation
- **Solitude or a primitive and unconfined type of recreation**—Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation (Landres et al. 2008)

These four qualities are used in this EIS to evaluate the extent to which wilderness values are either preserved, restored, or diminished under each alternative.

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts on qualities of wilderness character would occur and would be highly localized in the wilderness portion (including both the congressionally designated wilderness and congressionally designated potential wilderness) of the project area.
Moderate:	Impacts on qualities of wilderness character would be readily apparent in the wilderness portion (including both the congressionally designated wilderness and congressionally designated potential wilderness) of the project area.
Major:	Impacts on qualities of wilderness character would be readily apparent and widespread throughout the wilderness portion (including both the congressionally designated wilderness and congressionally designated potential wilderness) of the project area.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

DBOC operations currently represents the only nonconforming structures and uses in the 1,363 acres of congressionally designated wilderness in Drakes Estero. Cessation of these uses by November 30, 2012 would allow NPS to convert Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness in 2012 under alternative A.

As described in the “Laws and Policies” section above, the four wilderness qualities can be summarized as untrammeled, natural, undeveloped, and providing opportunities for solitude or a primitive and unconfined type of recreation.

Removal of bags, racks, and associated shellfish infrastructure from approximately 142 acres of Drakes Estero and would cease the use of motorboats in approximately 740 acres of Drakes Estero. These actions would result in removal of the human-made structures and motorized boat traffic, both of which currently impose human manipulation on natural processes. Following removal, biophysical processes such as sediment transport and nutrient cycling would be unhindered by human manipulation. By removing the uses and structures that currently manipulate the biophysical environment, alternative A would result in a noticeably more untrammelled environment. This would be a readily apparent, widespread improvement in wilderness character.

The cessation of commercial shellfish operations would eliminate the most apparent effect of modern civilization from in Drakes Estero. Removal of cultured shellfish and associated infrastructure and equipment from Drakes Estero, which would allow the ecosystem to regain a natural population of shellfish, eelgrass, and other ecosystem components, both biological and physical. The Pacific oyster, which is the primary species cultured by DBOC, is not native to California (Trimble, Ruesink, and Dumbauld 2009). Over 6 million of the nonnative Pacific oysters (approximately 585,000 pounds) were harvested in 2010 (CDFG 2010a). Additionally, DBOC recently began cultivation of Manila clams and planted 1 million seeds in Drakes Estero in 2009 (CDFG 2009a). The Manila clam also is a nonnative species. Such introductions have the potential to develop naturally breeding populations in Drakes Estero (NAS 2004, 2009). Research shows that the introduction of commercially grown nonnative bivalve species carries a certain level of risk that the nonnative species would outcompete native bivalves, leading to a decrease in local biodiversity for native bivalve species (Ruesink et al. 2005; Trimble, Ruesink, and Dumbauld 2009; Dumbauld, Ruesink, and Rumrill 2009; NAS 2010). Thus far, one incidence of naturalized Manila clams has been observed in Drakes Estero (Grosholz 2011b). Under alternative A, cessation of DBOC operations would reduce the risk of active spread of naturalized species such as Manila clam.

Historic importation of the Pacific oyster on cultch has resulted in the introduction of other nonnative species to the region (NAS 2009, 2010; Foss et al. 2007), such as the pathogen *Haplosporidium nelsoni* (MSX) (Friedman 1996; Burreson and Ford 2004), herpes-like viruses (Burge et al. 2005; Burge, Griffin, and Friedman 2006; Friedman 1996), and particularly the invasive colonial tunicate *Didemnum vexillum* (*Didemnum*) (Lambert 2009; Foss et al. 2007). As noted in NAS (2009), commercial shellfish operations increase the availability of hard substrate for colonization by tunicate in Drakes Estero. The termination of DBOC activities would greatly reduce the potential for shellfish cultivation-related propagation of nonnative species such as colonial tunicates, which take advantage of the substrate created by the shellfish operation structures, and have recently been documented colonizing the leaf blades of eelgrass (Carman et al. 2009; Carman and Grunden 2010; Grosholz 2011b). Removal of the 7 acres of racks and all cultivated shellfish would reduce potential habitat for nonnative species. Nonnative species currently present in Drakes Estero may persist in the absence of commercial shellfish operations; however, future efforts at control would be more likely to be successful in the absence of continued introduction and/or distribution.

Current DBOC operations also impact eelgrass, fish, harbor seals, and birds, as described under those impact topics. Eelgrass damaged by continued motorboat use (approximately 8.5 miles of estimated damage in the approximately 740 acres used by boats) would have an opportunity to regenerate under this alternative and would no longer be shaded by 7 acres of racks. Restoration of eelgrass, a designated essential fish habitat, would indirectly benefit local fish communities by restoring a more natural distribution of fish species in Drakes Estero. Cleanup of shellfish operation-related debris could take

place. There would be no risk of increased contribution from ongoing commercial shellfish operations. The return of Drakes Estero to a more natural ecosystem would enhance the natural quality of the wilderness area.

Also, DBOC would no longer operate noise-generating equipment such as motorboats, pneumatic drills, the oyster tumbler, and onshore vehicles. Noise associated with commercial shellfish operations would no longer disturb wildlife in the project area. As discussed in greater detail under the impact topic of soundscapes, pneumatic drills and oyster tumblers are used by DBOC staff for approximately 2 hours per day near the dock. DBOC's pneumatic drills are estimated to produce sound levels between 67 and 80 dBA at 50 feet. Use of drills at these levels could take between 0.4 miles (2,071 feet) and 1.4 miles (7,537 feet) for the noise to decrease to the ambient sounds level (34 dBA). Detail related to soundscapes is provided in the "Impacts on Soundscapes" section of this chapter. Human activities can disturb harbor seals at haul-out sites, causing changes in harbor seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007; Acevedo-Gutierrez and Cendejas-Zarelli 2011). Negative population-level, behavioral, and habitat-use consequences of higher ambient sound levels from human voices, along with sound events associated with human activities (motorists, hikers), have been observed in many species (Frid and Dill 2002; Habib, Bayne, and Boutin 2007). Cessation of DBOC motorboat use would eliminate disturbance of wildlife related to DBOC operations.

Therefore, by removing the uses and structures that currently cause alterations to the natural ecosystem, particularly with respect to introduction and perpetuation of large numbers of nonnative species, alternative A would result in a noticeably more natural environment. This would be a readily apparent, widespread improvement in wilderness character.

For many of the same reasons mentioned above, cessation of DBOC operations and removal of DBOC motorboats and infrastructure would remove evidence of human occupation and allow natural processes to restore the "primeval character" and influence of Drakes Estero. Under alternative A, the "undeveloped" characteristics of Drakes Estero would be restored through the removal of racks, resulting in a readily apparent, widespread improvement in wilderness character.

Removal of structures and motorboats in Drakes Estero would enhance opportunities for solitude in Drakes Estero, allowing visitors to enjoy a primitive and unconfined form of recreation. Many visitors kayak (or use other types of nonmotorized boats) in Drakes Estero. Under this alternative, opportunities for solitude and primitive recreation would no longer be interrupted by DBOC's daily motorboat use (approximately 12 trips per day, six days per week) or the visual disturbance to the natural scene associated with the presence of shellfish operation-related structures such as racks or debris such as plastic spacers. Similarly, noise produced by onshore DBOC operations also has the potential to impact wilderness, despite the 670-foot distance between onshore facilities and the northern wilderness boundary, because of the potential for sounds to travel great distances over water, disrupting opportunities for solitude. Cessation of these operations would allow the sound level in the wilderness area to return to that of a predominantly natural soundscape.

There are a number of approaches to remove the racks, ranging from import of a small barge with hydraulic lift to pull the posts to deconstruction using existing barge and boats. While most of the removal activities would be manual, mechanized boats would be required for the duration of the removal activities. Use of these boats would be subject to minimum requirement and minimum tool analysis. Use

of motorized craft to remove the racks would temporarily (lasting 2 to 3 months) impact the ability of Drakes Estero to offer an outstanding opportunity for solitude. Visitors wishing to enjoy a primitive and unconfined form of recreation would be disturbed during the duration of rack removal.

Under alternative A, NPS would maintain the existing access road, kayak launch, parking lot, interpretive board, and vault toilet. All of these facilities are located outside wilderness. NPS would install a new gate to limit boat access to Drakes Estero during harbor seal pupping season. This would not cause a change in visitor use patterns because Drakes Estero is currently closed to recreational boating during the harbor seal pupping season. The ongoing maintenance of these facilities would support continued access by Seashore visitors to the wilderness areas of Drakes Estero, except during harbor seal pupping season. For the reasons described above, opportunities for solitude and for primitive and unconfined recreation in Drakes Estero would be maintained and enhanced under alternative A. This would result in a readily apparent, widespread improvement in wilderness character.

Common to all alternatives, baseline surveys and monitoring of resources would occur to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, Manila clams, Olympia oyster, etc.) and eelgrass. These surveys and results of monitoring would provide site-specific data and lead to a better understanding of the natural ecological processes in Drakes Estero, thus improving long-term management of Drakes Estero.

NPS currently prohibits other Seashore visitors from using mechanized boats and equipment in the congressionally designated potential wilderness areas in Drakes Estero. This prohibition is consistent with the Wilderness Act and NPS *Management Policies 2006*, which require NPS to manage potential wilderness as wilderness to the extent that existing nonconforming uses allow (NPS 2006d). Since DBOC's commercial shellfish operation is the only nonconforming use in Drakes Estero, DBOC has been allowed to maintain manmade structures and operate motorboats and mechanized equipment in Drakes Estero. Under alternative A, the removal of human-made structures and motorboats from Drakes Estero would result in the complete removal of all nonconforming uses from the congressionally designated potential wilderness. This would allow NPS to convert the congressionally designated potential wilderness to congressionally designated wilderness and add it to the Phillip Burton Wilderness Area. This action would be consistent with the intent of the Point Reyes Wilderness Act of 1976. Under the procedures established for conversion, a notice would be published in the Federal Register confirming the removal of all nonconforming uses and the area would then be included in the Phillip Burton Wilderness Area. Following conversion, NPS would manage Drakes Estero in accordance with the Wilderness Act and NPS wilderness management policies without exception.

As described above, alternative A would result in long-term beneficial impacts on wilderness because cessation of DBOC operations and removal of DBOC facilities would result in a readily apparent, widespread enhancement of wilderness characteristics and would allow for the conversion of the approximately 1,363 acres of congressionally designated potential wilderness to congressionally designated wilderness. Alternative A would also result in short-term minor adverse impacts on wilderness because removal of racks would detract from offering outstanding opportunities for solitude in highly localized areas of the congressionally designated wilderness in Drakes Estero.



The existing commercial shellfish materials in Drakes Estero, pictured here, would be removed (see photographic simulations in chapter 2). (Photo courtesy of VHB.)

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wilderness characteristics in the project area. These actions include planning and management activities, the Coastal Watershed Restoration: Geomorphic Restoration Project, and the CDFG MLPA initiative.

Planning and management activities may authorize the use of motorboats in Drakes Estero for research or administrative purposes. Motorboat use in wilderness is subject to a minimum requirement analysis. The minimum requirement analysis would determine first whether the proposed action is appropriate or necessary for administration of the area as wilderness and whether it would cause a significant impact on wilderness resources and character, in accordance with the Wilderness Act. Should administrative motorboat use be determined necessary, the minimum requirement concept would require further analysis of the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized (NPS 2006d). Because these permits would continue to be subject to the minimum requirements analysis, motorboat use related for research or administrative activities in Drakes Estero would not be expected to cause a noticeable long-term adverse impact on wilderness characteristics. Any noticeable adverse impacts on wilderness characteristics would be temporary.

The geomorphic restoration project (part of the coastal watershed restoration program) was completed in 2008. It removed a nonconforming structure (a road crossing Glenbrook Creek) from the Phillip Burton Wilderness in the Drakes Estero watershed. In doing so, natural hydrology was restored to the site. The trail that used this road was rerouted upstream, where maintenance could be completed without use of mechanized equipment. In 2009, removal of Glenbrook Dam from the Glenbrook portion of Estero de Limantour resulted in removal of a nonconforming structure in the existing wilderness area. Removal of nonconforming structures resulted in a long-term beneficial impact on wilderness.

The designation of Drakes Estero as a marine protection area under the MLPA provides additional protection for natural resources in Drakes Estero (NPS adopts state fishing laws to the extent that they are not inconsistent with NPS management of the area). Under the MLPA, the only type of public fishing allowed in the marine protection area is the recreational take of clams. Recreational clamming has the potential to disrupt sediment and impact benthic fauna habitat on mudflats and sandbars. Such disruption imposes human manipulation on resources in the wilderness, but because such an activity is known to take place only occasionally, no noticeable change in the ecosystem would take place. Therefore, the untrammled quality of wilderness may be somewhat diminished; however, because members of the public who want to clam in Drakes Estero would have to do so without the use of mechanized equipment, such a use would not prevent conversion of congressionally designated potential wilderness to congressionally designated wilderness.

These past, present, and reasonably foreseeable future actions would result in long-term beneficial impacts on wilderness characteristics. The impact of the past, present, and reasonably foreseeable future actions, in combination with the long-term beneficial effects of alternative A, would result in a long-term beneficial cumulative impact on wilderness due to the removal of the existing nonconforming uses associated with DBOC operations, which degrade wilderness characteristics and prevent conversion to congressionally designated wilderness status. Alternative A would contribute an appreciable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative A would result in long-term beneficial impacts on wilderness because the cessation of DBOC operations and removal of DBOC facilities would result in a readily apparent, widespread enhancement of wilderness character. The enhancement of wilderness character would be due to the removal of a commercial shellfish operation that detracts from wilderness character, including:

- removal of nonnative shellfish cultivation (approximately 585,000 pounds in 2010); this equates to approximately 6 million oysters
- removal of human-made infrastructure associated with commercial shellfish operations, including 5 miles (7 acres) of racks and up to 88 acres of bottom bags in up to 142 acres of Drakes Estero
- discontinuation of motorboat operations, including use of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; and discontinuation of ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring as documented in the “Impacts on Eelgrass” section
- discontinuation of noise sources associated with commercial operation affecting wilderness

Alternative A would also result in short-term minor adverse impacts on wilderness because activities related to the removal of racks would detract from offering outstanding opportunities for solitude in highly localized areas of the congressionally designated wilderness in Drakes Estero. The cumulative impact would be long term and beneficial, and alternative A would contribute an appreciable beneficial increment to the cumulative impact.

Alternative A would enable NPS to fulfill its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS *Management Policies 2006* to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d).

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wilderness include:

- Continued use and maintenance of shellfish racks and bags in Drakes Estero
- Continued motorized boat traffic
- Continued use of noise-generating equipment
- Production of up to 600,000 pounds of shellfish per year
- Species cultivated could include:
 - Permit Area 1: Pacific oysters and Manila clams
 - Permit Area 2: Purple-hinged rock scallops

The presence of DBOC's commercial shellfish operations, including continued cultivation of nonnative shellfish and maintenance of shellfish-related structures and materials and motorboats in Drakes Estero, would perpetuate the conditions that adversely impact wilderness characteristics and experiences in Drakes Estero. It also would result in 10 more years of nonconforming uses in congressionally designated potential wilderness, which would prevent conversion to congressionally designated wilderness. As described above, the four wilderness qualities are untrammeled, natural, undeveloped, and providing opportunities for solitude or a primitive and unconfined type of recreation.

Under alternative B, DBOC's bags, racks, and associated shellfish infrastructure would remain in Drakes Estero, covering approximately 138 acres. DBOC also would continue to use motorboats to access these culture beds approximately eight hours a day, six days per week, for an additional 10 years. DBOC motorboat travel has been known to take place in up to 740 acres in Drakes Estero. These actions would perpetuate the presence of human-made structures and motorized boat traffic, both of which currently impose human manipulation on biophysical processes. Therefore, by permitting DBOC to operate for another 10 years, alternative B would result in an environment that is not untrammeled. This would have a readily apparent, widespread, adverse impact on wilderness character.

Under alternative B, DBOC operations would impose a number of changes on the native species composition and habitat availability in the wilderness area. DBOC would continue to cultivate nonnative oysters and clams in Drakes Estero. Pacific oysters and Manila clams would be grown in Area 1 (formerly Lease M-438-01; 1,078 acres). Continued cultivation of nonnative species alters the natural ecological system due to human manipulation. Under alternative B, NPS would limit production to 600,000 pounds of shellfish per year. Assuming 100 percent production of oysters, this could result in approximately 7.06 million individual shellfish being harvested annually. The risk for active spread of naturalized species

such as Manila clam and the invasive tunicate *Didemnum* would continue. Pacific oyster also have the potential to naturalize. In addition, the cultivation of these nonnative shellfish requires substrate on which oysters can grow. DBOC's use of racks, bags, and motorboats would have a number of impacts that would further alter the natural characteristics of Drakes Estero, and the risk of shellfish operation debris being released into Drakes Estero. Impacts from these items include shading of potential eelgrass habitat, approximately 8.5 linear miles of eelgrass damage from boat propellers, providing artificial habitat for structure-dependent fish species, adding manmade structures that may both increase habitat and decrease habitat for benthic organisms, and indirect introduction of nonnative species (i.e., the invasive tunicate *Didemnum*) and molluscan diseases. Additionally, the generation of noise by DBOC operations, both onshore and in Drakes Estero, would have the potential to disturb birds and harbor seals. Impacts on the ecosystem are described in additional detail under the "Wildlife and Wildlife Habitat" impact topics. Also, DBOC would continue to operate noise-generating equipment such as motorboats, pneumatic drills, the oyster tumbler, and onshore vehicles. Human-caused noise would continue to disturb wildlife in the project area. These activities would alter the natural ecosystem and natural soundscape in Drakes Estero. DBOC's operations under alternative B would result in a widespread and readily noticeable adverse impact on the natural aspects of wilderness character for an additional 10 year period.

For many of the same reasons mentioned above, the presence of DBOC's commercial shellfish operations and manmade structures would negatively affect the primeval character and influence of Drakes Estero. Therefore, DBOC's operations under alternative B would result in a readily apparent, widespread adverse impact on the "undeveloped" characteristics of Drakes Estero for an additional 10 year period. DBOC's continued operation of motorboats in Drakes Estero 6 days per week, approximately 8 hours per day for the next 10 years (DBOC [Lunny], pers. comm., 2011h) would disrupt the opportunities for visitors to experience solitude in Drakes Estero. Many visitors kayak or use other types of nonmotorized boats (such as canoes), a primitive and unconfined form of recreation, in Drakes Estero. Noise from both motorboats and onshore operations would detract from the opportunities for solitude for these visitors. DBOC's continued maintenance of nonnative shellfish and shellfish infrastructure and any fugitive debris in Drakes Estero also would visually intrude on this experience. Therefore, under alternative B, opportunities for solitude and primitive and unconfined recreation in Drakes Estero would be adversely affected by DBOC operations for an additional 10-year period resulting in readily apparent, widespread, adverse impacts on wilderness character.

Under this alternative, DBOC would repair/replace 50 of the racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{lxii}). Although DBOC has not indicated whether additional boat use would be required to conduct these repairs, this may be the case. This proposal would replace and repair human-made structures in congressionally designated potential wilderness. The continued maintenance of structures for commercial use may further inhibit the ability of Drakes Estero to provide outstanding opportunities for solitude or primitive and unconfined recreation in the short term.

Under alternative B, NPS would maintain the existing access road, kayak launch, parking lot, interpretive board, and vault toilet. These facilities are located outside wilderness. The impacts of this ongoing maintenance would be similar to those impacts described under alternative A; however, NPS would not install a gate to exclude visitors from Drakes Estero during harbor seal pupping season. The continued maintenance of these facilities would support continued access by Seashore visitors to the wilderness areas of Drakes Estero, except during harbor seal pupping season. Motorboats may occasionally be used

by NPS staff for management or other purposes in Drakes Estero; however, such use would continue to be subject to a minimum requirement analysis, as described under alternative A.

NPS currently prohibits Seashore visitors from using mechanized boats and equipment in the potential wilderness areas in Drakes Estero. This prohibition is consistent with the Wilderness Act and NPS *Management Policies 2006*, which require NPS to manage potential wilderness as wilderness to the extent that existing nonconforming uses allow (NPS 2006d). The DBOC commercial operation is the only nonconforming use in Drakes Estero, and its operations, most notably motorboat use six days per week and the maintenance of nonnative species and manmade infrastructure, are exempted from the prohibitions on commercial enterprise, mechanized equipment, and the installation of structures in potential wilderness. With the issuance of a new SUP for DBOC operations until 2022, DBOC operations would remain exempt from these prohibitions but the restrictions on Seashore visitors would continue.

Issuance of a new SUP to DBOC would be inconsistent with the direction provided by Congress in the 1976 legislation establishing wilderness at Point Reyes and with NPS *Management Policies 2006*, which directs NPS to seek to remove nonconforming uses and convert congressionally designated potential wilderness to congressionally designated wilderness status (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation.

As described above, alternative B would result in long-term major adverse impacts on wilderness because it would result in a readily apparent, widespread impact on wilderness characteristics and would prevent conversion of the 1,363 acres of congressionally designated potential wilderness in Drakes Estero to congressionally designated wilderness.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wilderness characteristics in Drakes Estero. Commercial shellfish operations would cease in the project area and the resulting impacts on wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wilderness characteristics in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include planning and management activities, the Coastal Watershed Restoration: Geomorphic Restoration Project, and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term major adverse impacts of alternative B, would result in a long-term major adverse cumulative impact on wilderness characteristics. Alternative B would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative B would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include

- continued cultivation of nonnative shellfish (up to 600,000 pounds per year, otherwise expressed as approximately 7.06 million oysters annually)
- continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 5 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero
- continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass"
- continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness)

The cumulative impact would be long term, major, and adverse, and alternative B would contribute an appreciable adverse increment to the cumulative impact.

Alternative B would prevent NPS from fulfilling its obligations under the acts designating wilderness in the Seashore (PL 94-544 and PL 94-567) and NPS *Management Policies 2006* to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation. However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to the existing commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wilderness are the same as described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC's racks and bags would occupy the same space as under alternative B. The change in production limit (from 600,000 pounds per year under alternative B to 500,000 pounds per year under alternative C) is also not expected to result in any

difference in impacts. The only action associated with alternative C that has the potential to have differing impacts from alternative B is:

- Species cultivated could include:
 - Permit Area 1: Pacific oysters
 - Permit Area 2: Purple-hinged rock scallops

The primary difference in impacts on wilderness between alternatives B and C would be related to which species would be cultivated in which area. Unlike alternative B, Manila clams would be removed from all growing areas under alternative C, minimizing the potential for this nonnative species to become established in Drakes Estero and use resources that would otherwise be available to native bivalves and other benthic fauna. Purple-hinged rock scallops would continue to be limited to Area 2, and Pacific oysters would continue to be cultivated in Area 1 (897 acres). DBOC would be responsible for modifying current harvest and distribution practices to minimize potential for *Didemnum* to spread to other areas in Drakes Estero through fragmentation.

As described above, alternative C would result in long-term major adverse impacts on wilderness because it would result in a readily apparent, widespread, adverse impact on wilderness characteristics and would prevent conversion of the 1,363 acres of congressionally designated potential wilderness in Drakes Estero to congressionally designated wilderness.

As described under alternative B, upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wilderness character in Drakes Estero. Commercial shellfish operations would cease in the project area and the resulting impacts would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wilderness characteristics in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include planning and management activities, the Coastal Watershed Restoration: Geomorphic Restoration Project, and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term beneficial impacts. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term major adverse impacts of alternative C, would result in a long-term major adverse cumulative impact on wilderness characteristics. Alternative C would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative C would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness

to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include

- continued cultivation of nonnative shellfish (up to 500,000 pounds per year, otherwise expressed as approximately 5.88 million oysters annually)
- continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero
- continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass"
- continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness)

The cumulative impact would be long term, major, and adverse, and alternative C would contribute an appreciable adverse increment to the cumulative impact.

Alternative C would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS *Management Policies 2006* to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for continued commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that have the potential to impact wilderness are the same as described under alternative B, with a few exceptions. Differences from alternative B that have the potential to impact wilderness include:

- Production of up to 850,000 pounds of shellfish per year
- Species cultivated could include: Pacific oysters, Olympia oysters, Manila clams, and purple-hinged rock scallops

The limit on shellfish production under alternative D (850,000 pounds per year) would be higher than under alternatives B and C (600,000 and 500,000 pounds per year, respectively). DBOC has not submitted a detailed business plan for this level of operations. Nevertheless, it is reasonable to assume that this increase in production would result in increases in boat use, processing hours onshore, vehicle use, and racks used and repaired, as well as the potential construction of a new processing facility. All of these changes would result in increased noise, disturbance, and visual impact in and adjacent to wilderness. The expansion of human presence and activity in Drakes Estero, which would result in greater adverse impacts on wilderness character under alternative D, when compared to alternatives B and C.

The primary differences in impacts on wilderness between alternatives B and D would be related to which species would be cultivated in which area, shellfish production limits, and construction of new onshore facilities. Pacific oysters, Olympia oysters, Manila clams, and purple-hinged rock scallops would all be cultivated in Area 1 under this alternative. DBOC also proposes to gather swimming larvae of native species (i.e., Olympia oyster and purple-hinged rock scallops) from Drakes Estero under this alternative. The increased potential for cultivation of species that are native to the California coast could result in a slightly more natural ecosystem despite the fact that these species (Olympia oyster and purple-hinged rock scallops) are not known to naturally occur in Drakes Estero in large numbers; however, capture and cultivation of larvae would impose modern human control over the natural ecosystem.

As described above, alternative D would result in long-term major adverse impacts on wilderness because it would result in a readily apparent, widespread impact on wilderness characteristics and would prevent conversion of the 1,363 acres of congressionally designated potential wilderness in Drakes Estero to congressionally designated wilderness.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts to wilderness characteristics in Drakes Estero. Commercial shellfish operations would cease in the project area and the resulting impacts on wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact wilderness characteristics in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include planning and management activities, the Coastal Watershed Restoration: Geomorphic Restoration Project, and the CDFG MLPA initiative. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term beneficial impacts. The impact of the past, present, and reasonably foreseeable future actions, when combined with the long-term major adverse impacts of alternative D, would result in a long-term major adverse cumulative impact on wilderness characteristics. Alternative D would contribute an appreciable adverse increment to the cumulative impact.

Conclusion

Overall, alternative D would result in long-term major adverse impacts on wilderness for an additional 10 years because it would result in a readily apparent, widespread, adverse impact on wilderness character and would prevent the conversion of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. The elements of DBOC's commercial shellfish operation that detract from wilderness character include

- continued cultivation of nonnative shellfish (up to 850,000 pounds per year, otherwise expressed as approximately 10 million oysters annually)
- continued maintenance of human-made infrastructure associated with commercial shellfish operations, including 7 miles of racks and up to 84 acres of bottom bags in up to 138 acres of Drakes Estero
- continued operation of 2-3 motorboats intermittently 8 hours per day, 6 days per week, covering approximately 740 acres of Drakes Estero; ongoing eelgrass impacts similar to the 8.5 miles of linear propeller scarring documented in "Impacts on Eelgrass"
- continued generation of noise sources associated with commercial shellfish operations affecting wilderness (emanating from both inside and outside wilderness)

The cumulative impact on wilderness would be long term, major, and adverse, and alternative D would contribute an appreciable adverse increment to the cumulative impacts.

Alternative D would prevent NPS from fulfilling its obligations under the acts designating wilderness in Point Reyes National Seashore (PL 94-544 and PL 94-567) and NPS *Management Policies 2006* to actively seek to remove from potential wilderness the temporary, nonconforming conditions that preclude wilderness designation (NPS 2006d). However, section 124 of PL 111-88 allows the Secretary to issue a permit to DBOC notwithstanding any other law, including the 1976 wilderness legislation. During the term of the new permit, NPS would continue to manage Drakes Estero in accordance with the Wilderness Act and complementary NPS policy to the extent possible. However, motorboats and in-water infrastructure are necessary to support the shellfish operation. The use of motorboats six days per week, the presence of infrastructure related to commercial shellfish operations, and the presence of a commercial enterprise in Drakes Estero would substantially detract from the wilderness characteristics of Drakes Estero for an additional 10 years. Collection of larvae is considered and analyzed as part of this alternative; however, DBOC's proposal to collect native shellfish larvae in Drakes Estero would not be consistent with the NPS mission, per *Management Policies 2006* (NPS 2006d), or regulations.

IMPACTS ON VISITOR EXPERIENCE AND RECREATION

LAWS AND POLICIES

NPS *Management Policies 2006* (NPS 2006d) states that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks.

As summarized in chapter 3, section 5 of *NPS Management Policies 2006* (NPS 2006d) states that in its role as steward of park resources, the NPS must ensure that park uses that are allowed would not cause impairment of, or unacceptable impacts on, park resources and values. When proposed park uses and the protection of park resources and values come into conflict, the protection of resources and values must be predominant. Appropriate visitor enjoyment is often associated with the inspirational qualities of the parks. As a general matter, preferred forms of enjoyment are those that are uniquely suited to the superlative natural and cultural resources found in the parks and that (1) foster an understanding of and appreciation for park resources and values or (2) promote enjoyment through a direct association with, interaction with, or relation to park resources. These preferred forms of use contribute to the personal growth and well-being of visitors by taking advantage of the inherent educational value of parks. Equally important, many appropriate uses also contribute to the health and personal fitness of park visitors. These are the types of uses that the NPS will actively promote, in accordance with the NPS Organic Act.

Pursuant to *NPS Management Policies 2006* (NPS 2006d), concession contracts may only be awarded for certain, defined types of commercial operations. . Visitor services, as defined by NPS, must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the unit (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of “visitor service”]).

Wilderness, as defined by the Wilderness Act of 1964, “has outstanding opportunities for solitude or a primitive and unconfined type of recreation.” The act further states that “wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.”

METHODOLOGY

The area of analysis for visitor experience and recreation is the boundary of the Seashore. This section summarizes the impacts on visitor experience and recreation from the actions that would potentially occur in the area of analysis under each alternative. The potential for changes to the visitor experience and recreation was evaluated by assessing the limitations and assumed changes to visitor access and associated visitor uses related to the proposed alternatives, and determining whether these projected changes would affect the visitor experience. As described later in this section, DBOC estimates that approximately 50,000 people visit the oyster company annually (DBOC 2010n^{lxiii}), composing approximately 2.5 percent of the annual visitors to the Seashore (NPS 2011a). Specific data regarding the percentage of DBOC visitors who travel to the Seashore solely to visit the oyster company are not available; however, due to the proximity of other Seashore resources along Sir Francis Drake Boulevard, it is assumed that many of the annual visitors to DBOC also visit other areas of the Seashore during their trip. Visitors to the Seashore have a wide variety of interests that cannot be categorized into one group. Therefore, this section acknowledges that impacts associated with each alternative could be both beneficial and adverse. Specific impacts associated with each alternative are described below. In consideration of the existing conditions described in chapter 3, impacts are evaluated in the terms of the context, type (beneficial, adverse, direct, indirect), and duration (short-term and long-term).

Intensity Definitions

Negligible:	The impact is not detectable or measurable and would not affect visitors.
Minor:	Impacts on visitor experience and recreation would be detectable and would affect a small portion of Seashore visitors.
Moderate:	Impacts on visitor experience and recreation would be readily apparent and would affect many Seashore visitors.
Major:	Impacts on visitor experience and recreation would be readily apparent and would affect the majority of Seashore visitors.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

The termination of the existing commercial shellfish operation and removal of associated personal property from the site would provide visitors with a more natural experience in the project area. In particular, as illustrated in the photographic simulations below, the removal of shellfish operation-related property, such as racks and bags, and associated debris would provide kayakers, hikers, and other visitors to the project area with a more natural view of Drakes Estero during low tide and would eliminate the source of commercial shellfish operation-related debris that may wash up on surrounding beaches and shorelines. Photographic simulations provide visual examples of the project area before (existing conditions) and after (alternative A) the removal of DBOC onshore and offshore facilities and structures. Actual conditions following removal are predicted based on the surrounding area. Future conditions may vary somewhat from the depicted image.



Left: View of existing onshore DBOC facilities facing north, taken during February 2011 site visit. (Photograph courtesy of VHB.)

Right: Photographic simulation of conditions along the eastern shoreline of Schooner Bay (looking north) (the same view as the photograph to the left) following the removal of DBOC facilities under alternative A.



Left: View of existing oyster rack in Drakes Estero used by DBOC for Japanese hanging culture, as seen at low tide (during high tide, only the top of the racks—the stringers—are visible). (Photograph courtesy of NPS.)

Right: Photographic simulation of the same view of Drakes Estero, following the removal of DBOC facilities under alternative A.



Left: View of DBOC bottom bag culture methods used by DBOC for clams and oysters. Photograph was taken during a 2009 low tide (during high tide, bags may be submerged). (Photograph courtesy of NPS.)

Right: Photographic simulation of the same view of Drakes Estero following the removal of DBOC facilities under alternative A.

The cessation of DBOC operations also would eliminate smell and sound disturbances associated with commercial shellfish operations. The recreational use of motorboats in Drakes Estero would continue to be prohibited because of the congressional wilderness designation. In addition, radios would no longer be used by DBOC staff in the project area to listen to music. As such, visitors would be provided an opportunity for solitude and a primitive or unconfined type of recreation, a hallmark of a wilderness experience. As such, alternative A would have a beneficial impact on the visitor experience and recreation for those seeking a natural park experience in Drakes Estero.

DBOC estimates that approximately 50,000 people visit the oyster company annually (DBOC 2010n^{lxiv}), composing approximately 2.5 percent of the approximately 2 million annual visitors to the Seashore (NPS 2011a). Specific data regarding the percentage of DBOC visitors that travel to the Seashore solely to visit the oyster company are not available; however, due to the proximity of other Seashore resources along Sir Francis Drake Boulevard, it is likely that many of the annual visitors to DBOC also visit other areas of the

Seashore during their trip. The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore as a whole. However, according to DBOC, the operation offers visitors an experience that is not afforded elsewhere in the Seashore (DBOC 2011^{lxv}). Based on information provided by DBOC, as described in chapter 3, these experiences include opportunities to

- purchase and eat fresh oysters on site
- learn about the history of agriculture and shellfish operations in the Seashore, the benefits of oysters (both as a food source and in the coastal ecosystems), and sustainable shellfish operations (Cummings 2011^{lxvi}; DBOC 2010^{lxvii}; DBOC 2011^{lxviii}).

Other area shellfish operations, such as the Tomales Bay Oyster Company and Hog Island Oyster Company, which offer similar experiences, have indicated that they are operating at capacity (with respect to visitation) and do not anticipate they could accommodate an increase in visitors due to the loss of DBOC (Tomales Bay Oyster Company 2011^{lxix}; Hog Island Oyster Company 2011^{lxx}). Therefore, the termination of commercial shellfish operations in Drakes Estero could adversely affect the experience for visitors interested in commercial shellfish operations and the recreational opportunities offered by DBOC. However, if the demand for such an experience is great enough after the closure of DBOC, it is likely that the market would adapt to meet these demands.

Under alternative A, the existing access road, parking lot, interpretive board, and vault toilet would be maintained. The NPS also would install a gate to prevent vehicular access to the parking lot during harbor seal pupping season. The gate would prohibit nonmotorized boat access to the water during this period, but would allow visitors to access Drakes Estero on foot. The annual closure of Drakes Estero to recreational boaters for harbor seal pupping season would remain in effect between March 1 and June 30, and under this alternative, a gate would be installed at the intersection of the existing access road with Sir Francis Drake Boulevard to prevent unauthorized boat access to Drakes Estero during pupping season. The public would still be allowed to access the shoreline areas of Drakes Estero. Maintenance of the existing NPS facilities would allow visitors to continue to benefit from these facilities. In particular, the parking facility allows for continued access to the beach and surrounding area, while the vault toilet ensures facilities for those visitors who wish to use the beach. The interpretive signs adjacent to the parking lot provide visitors with maps and important information about Drakes Estero and the harbor seal pupping season. The existing NPS facilities would be unchanged under alternative A; therefore, this element of alternative A would not impact visitor experience and recreation.

Based on the information provided above, overall, alternative A would result in a long-term beneficial or long-term minor adverse impact on visitor experience and recreation, depending on the interests of the particular visitor. The termination of commercial shellfish operations in Drakes Estero would enhance the visitor enjoyment of marine wilderness resources, but would eliminate an opportunity for the 2.5 percent of Seashore visitors, a small portion of the total Seashore visitation, who are interested in experiencing a commercial shellfish operation in the Seashore.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact visitor experience and recreation in the project area. These actions include kayaking and human-caused noise (other than DBOC), and planning and management activities.

Planning and management activities would continue to issue commercial use authorizations to commercial kayaking companies. Approximately 10 operators currently have commercial use authorizations from the Seashore to offer kayak equipment rentals and/or kayak tours in Drakes Estero. Of those authorized, only 3 provided kayak tours of Drakes Estero in 2010, accommodating a total of 221 visitors (NPS 2010g). If commercial shellfish operations are terminated in Drakes Estero, authorized kayak tour operators may choose to expand its tours in Drakes Estero. Additional commercial operators also may apply for commercial use authorization in the Seashore. This would provide more visitors with the opportunity to experience kayaking in the Seashore and enjoy the surrounding landscape from in Drakes Estero. Ongoing commercial kayak tours as well as ongoing private kayaking in Drakes Estero would result in a long-term beneficial impact on visitor experience and recreation in the project area.

Human-caused noise from actions such as overflights and cars along Sir Francis Drake Boulevard would continue to detract from the wilderness experience being sought by visitors to Drakes Estero. Therefore, ongoing human-caused noise would result in a long-term minor adverse impact on visitor experience and recreation in the project area.

Based on the information above, despite some adverse cumulative impacts, the impacts of these past, present, and reasonably foreseeable future actions would be long-term and beneficial. The beneficial impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term beneficial or long-term minor adverse impacts of alternative A, would result in long-term beneficial or long-term minor adverse cumulative impacts on visitor experience and recreation in the project area. Alternative A would contribute an appreciable beneficial or noticeable adverse increment to the cumulative impact on visitor experience and recreation.

Conclusion

Overall, alternative A would result in a long-term beneficial or long-term minor adverse impact on visitor experience and recreation, depending on the interests of the visitor. From the perspective of visitors seeking a natural park experience in Drakes Estero, alternative A would be beneficial because it would increase these opportunities. Alternative A would maintain visitor access to Drakes Estero, limiting access to recreational boaters only during the annual seal pupping season (March 1 to June 30). As described above, those looking to experience an active commercial shellfish operation would be adversely impacted by alternative A because they would no longer have this opportunity in the Seashore. The latter group of visitors composes up to 2.5 percent of the total visitors to the Seashore. Therefore, at a Seashore-wide scale, the adverse impacts associated with this alternative would affect a small portion of Seashore visitors. The cumulative impact would be long term and beneficial or long term, minor, and adverse, and alternative A would contribute an appreciable beneficial or noticeable adverse increment to the overall cumulative impacts.

With respect to visitor experience and recreation, alternative A would be consistent with relevant law and policy because the removal of DBOC would not represent the loss of a visitor service. Visitor services are defined by law as public accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the Seashore (36 CFR 51.3).

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact visitor experience and recreation include:

- continued tours of DBOC onshore facilities (conducted by DBOC staff)
- continued sale of DBOC shellfish products on site
- continued use and maintenance of shellfish racks and bags in Drakes Estero (including the repair/replacement of 50 racks in 2013 and 25 racks in 2014)
- continued motorized boat traffic

DBOC would continue to offer interpretive tours of its onshore facilities (focused on the history of and process associated with shellfish operations in Drakes Estero) and would continue to sell shellfish on site. Visitors to the project area would continue to have an opportunity to experience shellfish production first hand. Visitors could also purchase shellfish products on site and could consume them in the picnic area provided by DBOC. From the perspective of visitors interested in such an opportunity, alternative B would have a beneficial impact on visitor experience and recreation for an additional 10 years.

Continued DBOC operations related to shellfish production may disrupt the recreational experience desired by some visitors to the Seashore, in particular those visitors seeking a natural park experience, including those looking to experience solitude and a primitive, unconfined type of recreation, a hallmark of a wilderness experience. As described in the “Impacts on Wilderness” section of this chapter, the presence of DBOC operations, including shellfish-related structures and materials and motorized boats in Drakes Estero, would perpetuate the conditions that adversely impact the wilderness qualities and experiences in Drakes Estero. The four wilderness qualities are untrammeled, natural, undeveloped, and providing opportunities for solitude or a primitive and unconfined type of recreation. Both the activities associated with commercial shellfish operations in Drakes Estero and the presence of associated structures may be viewed as preventing the experience of an untrammeled, natural environment. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible (as shown in pictures in the “Impacts on Wilderness” section and chapter 2 of this document). This debris would also continue to wash up on the surrounding shoreline and on beaches. Visitors to Drakes Estero, including hikers and kayakers may experience sights, smells, or sounds associated with routine shellfish harvest and onshore processing operations, which may detract from the natural surroundings. In addition to the visual intrusions, these odors detract from visitor enjoyment of the natural surroundings.

Under this alternative, as detailed in chapter 2, DBOC would repair/replace 50 racks in 2013 and another 25 racks in 2014 (DBOC 2012b^{lxxi}). Following the initial wide-scale repairs (to approximately 75 percent of the racks), regular maintenance is proposed (DBOC 2012b^{lxxii}). NPS estimates that repair and replacement would be minimal with approximately 1,000 to 2,000 linear feet of lumber installed annually and a limited number of vertical posts replaced as necessary. Repair and replacement activities would temporarily increase disruptions to the visitor experience in Drakes Estero, both for DBOC visitors and those visitors seeking a natural park experience.

Alternative B would not noticeably change the visitor experience in the project area when compared to existing conditions; however, as specified in the methodology for this chapter, the impacts of the action alternatives are assessed against the anticipated conditions under the no-action alternative.

Overall, alternative B would result in a short-term, minor adverse impact and a long-term minor adverse or long-term beneficial impact on visitor experience and recreation for another 10 years, depending on the particular interests of the visitor. The adverse impact on visitors seeking a natural park experience would be readily apparent in Drakes Estero (the primary resource area), but only those visitors to the Seashore seeking a natural experience in Drakes Estero would be affected. The impacts would somewhat inhibit visitor enjoyment of marine wilderness resources, but would only affect a small portion of visitors, those seeking a natural park experience in Drakes Estero. The impact on visitors seeking to experience commercial shellfish operation and associated recreational opportunities in Drakes Estero would be beneficial because DBOC would continue to offer fresh oysters and educational experiences and services in Drakes Estero.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on visitor experience and recreation in the project area. Commercial shellfish operations would cease in the project area and the resulting impacts would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact visitor experience and recreation in the project area. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include kayaking, human-caused noise, and planning and management activities, as described under alternative A.

For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term beneficial. The impacts of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse or long-term beneficial impacts of alternative B, would result in long-term minor adverse or long-term beneficial impacts on visitor experience and recreation. Alternative B would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.

Conclusion

Overall, alternative B would result in short-term minor adverse impacts as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project area for an additional 10 years, depending on the interests of the visitor. Impacts from continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience in Drakes Estero, including those interested in experiencing solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music while working, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations would also detract from the natural environment. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative B to have a beneficial impact because DBOC would continue to offer experiences such as educational tours and services and fresh oysters to visitors. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative B would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact. In the short term, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.

With respect to visitor experience and recreation, this alternative would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of “visitor service”]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public’s use and enjoyment of the Seashore. Therefore, DBOC’s operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact visitor experience and recreation are the same as described under alternative B.

DBOC operations and facilities would be generally unchanged under alternative C, except that some existing unpermitted onshore structures, including the picnic area, would be removed from DBOC’s site.

NPS would provide a picnic area in the vicinity. Therefore, alternative C would result in minimal changes to the overall visitor experience in the project area compared to current conditions. All other impacts would be the same as described under alternative B.

As described above, alternative C would result in a short-term minor adverse impact and a long-term minor adverse or long-term beneficial impact on visitor experience and recreation in the Seashore for an additional 10 years, depending on the interests of the particular visitor. The impact on visitors seeking a natural park experience, including those seeking solitude and a primitive, unconfined type of recreation, would be readily apparent in Drakes Estero (the primary resource area), but only a small portion of all visitors to the Seashore (those seeking a natural experience in Drakes Estero) would be affected. From the perspective of these visitors, continued commercial shellfish operations in Drakes Estero would somewhat inhibit visitor enjoyment of the resources for which the Seashore was established. In contrast, visitors seeking to experience an active commercial shellfish operation would benefit from this alternative because DBOC would continue to offer such an opportunity.

In the short-term, the repair/replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on visitor experience and recreation in the project area. The impacts associated with this conversion to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact visitor experience and recreation in the project area. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include kayaking, human-caused noise, and planning and management activities.

For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse or long-term beneficial impacts of alternative C, would result in a long-term minor adverse or long-term beneficial cumulative impact on visitor experience and recreation. Alternative C would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.

Conclusion

Overall, alternative C would result in short-term minor adverse and long-term minor adverse or long-term beneficial impact on visitor experience and recreation in the project area for an additional 10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. Specifically, from the perspective of those seeking a natural park

experience in Drakes Estero, including those looking to experience solitude and a primitive, unconfined type of recreation, the impacts would somewhat inhibit visitor enjoyment of the resources for which the Seashore was established. DBOC operations would be generally unchanged under alternative C for an additional 10 years despite some modifications proposed to the existing facilities and production levels. The visitor experience and recreational opportunities at the site would be similar to current conditions, except that the existing, unpermitted picnic area, located adjacent to the retail area and away from the shoreline, would be removed and would be replaced by NPS with another picnic area nearby. Visual and sound disturbances associated with commercial shellfish operations would be apparent in the project area, although the associated impacts would be mostly limited to those visitors looking to enjoy a natural park experience in Drakes Estero. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. This debris also would continue to wash up on surrounding shorelines and beaches. In addition, motorized boats would continue to operate in Drakes Estero, and DBOC staff would continue to operate radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the natural environment. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative C to have a beneficial impact because DBOC would continue to offer visitor experiences such as educational tours and services and fresh oysters. The cumulative impact would be long term, minor, and adverse or long-term and beneficial, and alternative C would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.

In the short term, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.

With respect to visitor experience and recreation, alternative C would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of “visitor service”]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public’s use and enjoyment of the Seashore. Therefore, DBOC’s operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for continued commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact visitor experience and recreation are the same as those described under alternative B, with a few exceptions. Differences from alternative B that would have the potential to impact visitor experience and recreation include:

- increased production limits
- new onshore development

Alternative D would provide for the production and distribution of a larger variety of shellfish (Pacific oysters, Olympia oysters, Manila clams, and purple-hinged rock scallops) and would increase production limits to 850,000 pounds of shellfish (approximately 40 percent greater than alternative B and 70 percent greater than alternative C). For visitors seeking a natural experience and/or solitude, the increased production levels may have a greater impact on visitor experience and recreation than alternatives B and C because increased production levels would likely result in greater motorized boat activity in Drakes Estero.

Alternative D would include a new processing plant and interpretive facility. The interpretive facility proposed by DBOC would likely focus on educating visitors about the history of and process associated with shellfish operations in Drakes Estero would not be consistent with the NPS requirements for interpretive services, as described in the NPS *Management Policies 2006* (NPS 2006d). Nonetheless, some visitors to the Seashore enjoy the experiences offered at DBOC, including the opportunity to learn about the history of shellfish operations in Drakes Estero. DBOC has submitted two concepts for what expanded development at the site might look like under alternative D. Modifications that could occur under Option 1 include a new two-story processing and interpretive facility, and an aquarium. Based on the most recent proposal from DBOC, Option 2 of alternative D includes the removal of nearly all existing DBOC facilities (DBOC 2011g^{lxxiii}). To replace those buildings demolished under Option 2, this version of alternative D would include the construction of a new multipurpose building, which would serve both processing and interpretive activities for DBOC (DBOC 2011g^{lxxiv}). The larger interpretive facilities proposed under both options of alternative D could allow DBOC to accommodate larger tour groups. Visitors also would be provided with increased opportunities to experience the stages of shellfish processing in an improved interpretive facility and retail shop. The new facilities would provide visitors with the opportunity to view the entire shellfish production process (seed production to shucking and packing) (DBOC 2011g^{lxxv}). From the perspective of those interested in visiting an active shellfish operation, this alternative would have a beneficial impact on visitor experience and recreation in the project area for 10 years. The benefits of alternative D also would be slightly greater than alternatives B and C due to the additional interpretive opportunities that would be available.

Construction activities associated with this alternative could result in adverse impacts on visitor experience and recreation in Drakes Estero for both Seashore visitors seeking a natural experience and DBOC visitors. In particular, such activities could further disturb soundscapes and views in Drakes Estero and could temporarily limit interpretive and educational experiences at DBOC.

Expanded and improved opportunities for those interested in learning more about commercial shellfish production at the site may result in a slight increase in visitors at the site; however, that is not expected to noticeably affect traffic flows in the area of analysis or access to the Coast Guard Communications Area Master Station Pacific (CAMSPAC) facility. Additional studies would be required to determine the effects of potential change on DBOC visitation and associated traffic conditions.

Continued, expanded shellfish production at DBOC may disrupt the recreational experience desired by some visitors to the Seashore, in particular those visitors seeking a natural park experience in Drakes Estero, including those looking to experience solitude and a primitive, unconfined type of recreation. As described in the “Impacts on Wilderness” section of this chapter, the presence of an active commercial shellfish operation in Drakes Estero, including related structures and materials and motorized boats, would perpetuate the conditions that adversely impact the wilderness qualities and experiences in Drakes Estero. The adverse impacts associated with this alternative would be slightly greater than those associated with the other action alternatives because of the increased production levels proposed. In

particular, continued motorized boat traffic would likely increase. During DBOC's redevelopment of the site, the demolition of existing facilities and construction of new facilities would involve the use of heavy equipment, which would further detract from the peaceful, natural experience that Seashore visitors may be seeking for the duration of the redevelopment. Construction activities also could require DBOC to temporarily limit its interpretive and educational services.

Overall, alternative D would result in a short-term moderate adverse impact and long-term minor adverse or long-term beneficial impact on visitor experience and recreation in the project area for an additional 10 years, depending on the interests of the particular visitor. The impact on visitors seeking a natural park experience would be readily apparent in Drakes Estero (the primary resource area), but only a small portion of the total number of visitors to the Seashore would be affected. From the perspective of those seeking a natural park experience in Drakes Estero, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Visitors to the Seashore who are interested in experiencing an active commercial shellfish operation would consider alternative D to have a beneficial impact because DBOC would continue to offer visitor experiences such as educational tours and services and fresh oysters. The benefits associated with this alternative would be slightly enhanced, in comparison to alternatives B and C because alternative D would facilitate expanded interpretation and educational opportunities at DBOC. During construction, alternative D also would result in short-term moderate adverse impacts on visitor experience and recreation for both groups of visitors. Construction vehicles and equipment could further disturb soundscapes and views in Drakes Estero and could temporarily limit some interpretive and educational services at DBOC. The repair/replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, also would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on visitor experience and recreation in the project area. The impacts associated with this conversion to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact visitor experience and recreation in the project area. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include kayaking, human-caused noise, and planning and management activities. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse or long-term beneficial impacts of alternative D, would result in a long-term minor adverse or long-term beneficial cumulative impact on visitor experience and recreation. Alternative D would contribute a noticeable adverse or appreciable beneficial increment to the cumulative impact.

Conclusion

As described above, alternative D would result in short-term moderate adverse as well as long-term minor adverse or long-term beneficial impacts on visitor experience and recreation in the project area for an additional 10 years, depending on the interests of the particular visitor. Continued commercial shellfish operations in Drakes Estero (the primary resource area) would be detectable at the Seashore scale and would affect a small portion of visitors to the Seashore. In particular, from the perspective of those seeking a natural park experience, the impacts would somewhat inhibit visitor enjoyment of marine wilderness resources. Similar to alternatives B and C, visual and sound disturbances associated with commercial shellfish operations could be readily apparent in the project area, and this impact would be particularly adverse for visitors seeking a natural park experience in Drakes Estero. Visual and sound disturbances associated with commercial shellfish operations would continue in the project area, and would be particularly adverse for visitors looking to enjoy solitude and a primitive or unconfined type of recreation in wilderness. Onshore and offshore structures and associated debris related to shellfish operations could detract from the views of Drakes Estero, especially during low tide when offshore equipment such as racks and bags are visible. Motorized boats also would continue to operate in Drakes Estero, and DBOC staff would continue to use radios to listen to music, both of which would detract from the natural soundscapes of the Seashore. The smell of motorized boats and routine shellfish processing operations also would detract from the natural environment. These adverse impacts would be greater than under alternatives B and C due to the increased production limits (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), which would likely increase motorized boat activity and the quantity of bags and other items associated with shellfish operations in Drakes Estero. Visitors to the Seashore who are interested in experiencing an active shellfish operation may consider alternative D to have a greater beneficial impact on visitor experience and recreation than the other alternatives because under this alternative the new facilities would enhance interpretation and educational opportunities at DBOC. However, in the short term, construction activities associated with alternative D could result in adverse impacts on visitor experience and recreation in Drakes Estero for both types of visitors. In particular, such activities could further disturb soundscapes and views in Drakes Estero and could temporarily limit interpretive and educational experiences at DBOC. In addition, the repair and replacement of 50 racks in 2013 and another 25 racks in 2014, followed by regular maintenance, also would temporarily increase disruptions to the visitor experience in Drakes Estero, both for visitors to the Seashore and DBOC visitors. The cumulative impact on visitor experience and recreation would be long term, minor, and adverse or long term and beneficial, and alternative D would contribute a noticeable adverse and appreciable beneficial increment to the cumulative impact.

With respect to visitor experience and recreation, alternative D would not further the goals of relevant law and policy. Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 USC 5951[b]; 16 USC 5952; 36 CFR 51.3 [definition of “visitor service”]). The primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore. Therefore, DBOC's operations would not be consistent with the values for which Drakes Estero was congressionally designated as wilderness.

IMPACTS ON SOCIOECONOMIC RESOURCES

LAWS AND POLICIES

The CEQ regulations implementing NEPA require that economic and social impacts be analyzed when they are interrelated with natural or physical impacts. Additionally, *NPS Management Policies 2006* requires the NPS to identify any impact on socioeconomic resources when determining the feasibility of a proposed action (NPS 2006d).

METHODOLOGY

This section summarizes how the impacts on socioeconomic resources from the actions that would potentially occur under each alternative are evaluated. Western Marin County, where DBOC is located, is primarily rural, with scattered, small, unincorporated towns that serve tourism, agriculture, and local residents. Potential impacts on socioeconomic resources were developed based on several sources of information, including official visitation statistics; information from previous studies; data provided by DBOC, the Seashore, and CDFG; and public scoping comments. Impacts are evaluated with regard to the type of impact (direct and indirect) and the context of the impact. At a regional (Marin County) or statewide level, depending on the scale of comparative data, this section considers whether impacts would be noticeable to the greater population and whether they would exceed regional thresholds (such as unemployment levels). In addition to the regional and statewide scale, the socioeconomic analysis evaluates impacts on the Inverness Census Designated Place (Inverness CDP), which is in Marin County. As the nearest municipality to the project area, socioeconomic data from Inverness CDP best reflects the conditions in the project area and offers an appropriate comparison to overall Marin County data. Specifically, impacts on the shellfish market are evaluated at a statewide scale while other socioeconomic resources considered in this section are discussed in terms of Inverness CDP and/or the county. This is because shellfish operations are dispersed throughout California and not concentrated in one county or region. Therefore, evaluating operations at a scale smaller than the state level would distort the role of that operation in the larger market. In addition, much of the available data related to the shellfish market is provided at a state level. Shellfish data at the county level is presented in this section for reference purposes only and is not considered to be representative of the larger market. This section also evaluates whether potential impacts would be perceptible to DBOC staff and their families. The analysis assumes that upon expiration of the SUP, whether it is 2012 or 2022, DBOC operations would terminate.

This section compares shellfish production at DBOC to overall statewide shellfish production, based on 2007/2008 data compiled from CDFG (CDFG 2011a, 2011c, 2011e, and CDFG [Ramey] pers. comm 2011d), the Pacific Coast Shellfish Growers Association (PCSGA 2009), and an independent survey of the California shellfish industry prepared by Ted Kuiper (Kuiper 2009). CDFG has acknowledged that its statewide production summaries do not accurately represent the total annual shellfish production in California. One reason is because the available CDFG data are not inclusive of all statewide oyster production. Some operations on private or granted tidelands are not accounted for in the totals because they are not required to report production data to CDFG. CDFG manages 16 leases for eight shellfish operations, including the 2 leases at DBOC. With the exception of DBOC, these operations are located on state-owned tidelands. In addition, approximately nine aquaculture operations in the state operate on

granted or private tidelands and submerged lands not owned by the State of California (CDFG [Ramey], pers. comm., 2011d). NPS developed this impact analysis using CDFG production data provided in April of 2012 (CDFG 2011e). In August of 2012, after NPS had completed this analysis, including IMPLAN modeling, CDFG notified NPS that in May of 2012 it changed its methodology for estimating state shellfish production. NPS acknowledges these changes; however, because these data were received after completion of the socioeconomic analysis, and are not anticipated to result in significant changes to NPS findings or conclusions, they have not been incorporated in this EIS.

Another reason the statewide production summaries do not accurately represent the total annual shellfish production in California is because shellfish weight is not estimated consistently for all shellfish operations. For commercial shellfish operations under state lease, shellfish production is reported to CDFG as the total number of shellfish produced, and is then converted into total weight (in pounds). Oyster weight is estimated based on gallons of oysters, which are estimated based on the total number of oysters produced. The number of Pacific oysters per gallon varies among shellfish operations. Typically, either 100 or 140 Pacific oysters are used to compose a gallon. At DBOC, CDFG has consistently considered 100 Pacific oysters to be a gallon (to report production numbers as well as calculate privilege use taxes), while in Tomales Bay, the weight has been calculated using the 140 Pacific oysters per gallon factor (CDFG [Ramey], pers. comm., 2011d). In addition, the conversion factor also varies by type of oyster. Approximately 300 Kumamoto or Eastern oysters compose a gallon, compared to 140 European flat oysters per gallon, and 400 Olympia oysters per gallon. These conversion factors have not been applied consistently to statewide production estimates; therefore, it is difficult to provide an exact percentage of DBOC's share of the California oyster and/or shellfish market. CDFG assumed 100 or 140 oysters per gallon for all types of oysters. Shellfish production data reported by Ted Kuiper, which were used by the Pacific Coast Shellfish Growers Association to determine 2008 oyster production rates and values in California, assume an average of 180 oysters per gallon to estimate both value and total oysters produced (Kuiper 2009).

Assumptions used to calculate quantities of Pacific oysters, total oysters, and shellfish produced in California for this analysis as provided in chapter 3 include the following:

- One gallon of oyster meat weighs 8.5 pounds
- Twenty mussels weigh 1 pound
- Thirty clams weigh 1 pound

Due to the varying approaches used to estimate statewide oyster production rates and value in California, DBOC's share of the oyster and shellfish market is presented as a range in this chapter. As described in chapter 3, in 2007/2008, shellfish harvested from DBOC composed between 16 and 35 percent of the oysters and between 13 and 33 percent of the shellfish produced in California. These ranges are applied, as appropriate, throughout this chapter. However, because Manila clams were not harvested at DBOC until 2009 and CDFG data are the only available statewide data for that year, DBOC's share of the statewide Manila clam market was estimated in comparison to CDFG data only.

To assess DBOC's overall contribution to the regional economy under each alternative, an input-output analysis was conducted using IMPLAN modeling. As described in chapter 3 of this Final EIS, input-output models, such as IMPLAN, map the linkages of inter-industry purchases and economic output in a given region. Revenue estimates, payroll, and employment data for DBOC have been incorporated into the analysis to quantify the direct impacts of DBOC operations on the regional economy, including an

estimate of value added. However, DBOC has requested that all financial data related to the operation of DBOC be kept confidential. Therefore, although data provided by DBOC were used as direct inputs and have been factored into the total effects, to adhere to DBOC's confidentiality request, separate direct, indirect, and induced impact data generated by the IMPLAN model have been excluded from the EIS. Only the total results are summarized under each of the alternatives. Where available, operation-specific payroll data can be input into IMPLAN to further refine results. The NPS has requested that DBOC provide payroll data for these purposes; however, DBOC did not provide this information. Instead, payroll was estimated by IMPLAN and considers the overall expenses and number of employees for DBOC and industry averages. These direct effect expenditures were applied to the model in *Industry Sector 14 – Animal production, except cattle and poultry and eggs*. (This IMPLAN industry sector includes oyster production, farm raising [NAICS Code 112512] and was selected as the industry that most closely resembled DBOC activity. *Sector 17 – Fishing and Sector 61 – Seafood product preparation and packaging* were also considered and tested, but did not appear to provide as close a match in terms of reported financial and employment conditions). In addition to the direct spending activity that is required to produce a dollar amount of a given product or service, IMPLAN also tracks and considers "indirect" purchases and "induced" spending. Input-output models yield "multipliers" that are used to calculate the total direct, indirect and induced effect on jobs, income and output resulting from each dollar of spending on goods and services in the area of analysis. The IMPLAN analysis provides an assessment of the total direct, indirect and induced effect on jobs, income and output.

Geographic Area Evaluated for Impacts (Area of Analysis)

For the purposes of this socioeconomic analysis, the following areas of analysis have been defined:

- Local Area of Analysis:** The local area of analysis is defined as Inverness CDP. Local impacts include those that would be noticeable to residents of Inverness CDP and/or small businesses.
- Regional Area of Analysis:** The regional area of analysis is defined as Marin County. Regional impacts include those that would be noticeable to the greater Marin County population and/or small businesses.
- Statewide Area of Analysis:** For the purposes of evaluating DBOC shellfish production, the State of California is considered the area of analysis for consistency with available shellfish production data, which are described in chapter 3 and summarized in the methodology above.

Intensity Definitions

- Negligible:** The impact is not detectable or measurable.
- Minor:** Impacts would be detectable but would not affect the overall economy.
- Moderate:** Impacts would be readily apparent but would not considerably affect the overall economy.
- Major:** Impacts would be readily apparent and would substantially influence the overall economy.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including commercial shellfish infrastructure in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

The termination of commercial shellfish operations in Drakes Estero would result in the loss of 31 full-time jobs and 1 part-time job, which includes all current DBOC staff (DBOC 2010j^{lxxvi}). From a regional perspective, 26 full-time DBOC staff and 1 part-time DBOC staff live in Marin County (22 of these in Inverness) and 5 full-time DBOC staff live in Sonoma County. DBOC makes up approximately 0.02 percent of the employed labor force in Marin County, 3.7 percent of the employed labor force in Inverness CDP, and 0.002 percent of the employed labor force in Sonoma County (DBOC 2010j^{lxxvii} U.S. Census Bureau 2006-2010). Assuming consistency with current employment data for Marin County and Inverness CDP, the closure of DBOC would not increase unemployment in these locales to a level above the 2010 statewide average which is 12.4 percent (U.S. Department of Labor 2011). Unemployment rates in Marin County in 2010 were 8.3, well below statewide averages in for that year (U.S. Department of Labor 2010). Inverness CDP reported zero unemployment (U.S. Census Bureau 2006–2010). Although the percent increase in the unemployment in Inverness CDP would be greater than that experienced by Marin County as a whole, unemployment levels would be approximately 4 percent, well below statewide averages (U.S. Census Bureau 2006-2010).

In addition to the loss of jobs, alternative A would require the relocation of the 15 DBOC staff and their family members who currently live in the five housing units (three mobile homes and two permanent wood-frame houses) at the site (DBOC 2010j^{lxxviii} 2010k^{lxxix}). At the time of report preparation, information pertaining to the total number of residents living in DBOC-provided housing was not readily available. Housing costs in Marin County and Inverness CDP are extremely high. The average cost to purchase or rent a home in Marin County and Inverness CPD was over \$800,000 or approximately \$1,500 per month between 2006 and 2010 (U.S. Census Bureau 2006-2010). As such, individuals may not have the opportunity to relocate in the immediate area. Former staff who choose to relocate outside Marin County would have an impact on the regional economy, because they would no longer be spending money at local establishments. Due to the small number of DBOC staff and their families affected by the relocation, this impact would be minimal. From a regional standpoint, the five housing units at DBOC compose less than 0.01 percent of the housing in Marin County and 0.5 percent of the homes in Inverness CDP (U.S. Census Bureau 2010). Additionally, DBOC staff make up only a small percentage of the population of both Marin County (0.01 percent) and Inverness CDP (2.1 percent) (U.S. Census Bureau 2010).

If existing authorizations for DBOC are allowed to expire, DBOC would no longer produce and sell/distribute shellfish in Drakes Estero, and DBOC would cease to operate. DBOC estimates that approximately 50,000 people visit the oyster company annually (DBOC 2010n^{lxxx}). This amounts to approximately 2.5 percent of the total visitors to the Seashore (NPS 2011a). Specific data regarding the percentage of DBOC visitors who travel to the Seashore solely to visit the oyster company are not available. DBOC is estimated to generate an annual payroll of approximately \$1 million and to account

for 2 to 3 percent of agricultural employment in the greater San Francisco-San Mateo-Redwood City metropolitan area (NAS 2009). However, DBOC's specific contribution to the regional, state, and/or local economy could not be determined at the time of report development. Data are not available regarding the number of visitors that come to the Seashore for the sole purpose of visiting DBOC (versus those who also visit other areas of the Seashore during their trip). Visitors to DBOC who also come to experience other areas of the Seashore would contribute to the regional, state, and local economy regardless of DBOC's presence, whereas, those who only travel to DBOC may or may not continue to come to the Seashore. It is assumed that the Seashore, as a whole, would continue to contribute to the regional economy, at current levels. In 2010, visitation and payroll at the Seashore accounted for a total of approximately \$51 million in labor income and \$80 million in value added. This represents 0.5 percent of the value added for all of Marin County. Value added to the county economy from DBOC is equivalent to 1 percent of the Seashore's contributions, or 0.006 percent of the total value added in the county.

Terminating commercial shellfish operations at DBOC would eliminate a local source of shellfish for the San Francisco Bay Area. Approximately 80 to 90 percent of the shellfish produced at DBOC is distributed to the region (DBOC [Lunny], pers. comm., 2011h). Pacific oysters harvested at DBOC constitute between 16 and 35 percent of the California oyster market and between 13 and 33 percent of the overall shellfish market, depending on the metric considered (value, weight, or total number of individual oysters) and the source of the statewide estimates (see chapter 3) (CDFG 2011a, 2011c, 2011e; PCSGA 2009; Kuiper 2009). At a county level, DBOC produced 68 percent of the oysters cultivated in Marin County in 2007/2008 and 64 percent of the shellfish. However, between 2009 and 2011 shellfish production in Tomales Bay increased and DBOC's share of the county market decreased to approximately 50 percent. In 2010 aquaculture in Marin County composed 7.6 percent of the gross value of agricultural production (MCDA 2011).

Between 2007 and 2009, an average of 1.2 million pounds (17.1 million individuals) of shucked Pacific oyster meat, 1.3 million pounds (21.2 million individuals) of total shucked oyster meat, and 1.65 million pounds (22.9 million individuals) of shellfish were produced annually in California (CDFG 2011a, CDFG [Ramey], pers. comm., 2011d). This alternative would reduce the quantity of shellfish produced in California, which could result in price fluctuations. However, as described in chapter 3, shellfish as a commodity are relatively inelastic (Russo et al 2008, Sorte 2010), meaning that demand for shellfish would not likely change due to price increases (or decreases).

Manila clams harvested at DBOC in 2009 and 2010 encompassed only 1 percent and 0.04 percent, respectively, of the total Manila clams harvested in California those years. In 2011, Manila clam production at DBOC declined 83 percent compared to 2010 production, while statewide clam production only declined 20 percent. Although Manila clams were the only clams harvested in California in 2009 and 2010 (CDFG 2011b), because DBOC produces a very small percentage of the state's Manila clams, it is unlikely that alternative A would noticeably affect Manila clam production statewide.

Under alternative A, the termination of DBOC shellfish operations would result in the loss of the associated direct, indirect, and induced economic activity. As indicated in chapter 3 of this Final EIS, this includes approximately 31 jobs, and \$1.1 million in value added (see table 3-8). DBOC has requested all financial data related to the operation of DBOC be kept confidential. Therefore, although data provided by DBOC were used as direct inputs and have been factored into the total effects, separate direct, indirect,

and induced impact data generated by the IMPLAN model have been excluded from the EIS. Only the total results are provided in table 3-8 and summarized here.

As described above, alternative A would result in long-term minor, adverse impacts on local and regional socioeconomic resources because DBOC staff would lose jobs and some staff and their families would also lose housing. These impacts would be detectable at a local scale, but would not affect the overall local or regional economy. Alternative A could result in long-term, major, adverse impacts on California's shellfish market because the loss of DBOC production (estimated at 13 to 33 percent of the state's shellfish production) would cause a readily apparent change in statewide shellfish production.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact regional socioeconomic resources. These actions include existing ranching operations, kayaking in Drakes Estero, the proposed California Aquaculture Programmatic Environmental Impact Report (PEIR), changes to NOAA aquaculture policies, and economic trends.

Similar to DBOC, the existing ranches contribute to the regional economy by providing jobs for some area residents and offering a local specialty food source. Continued operation of the ranches would maintain a long-term beneficial impact on the regional economy.

In 2010, 3 of the approximately 10 commercial entities authorized to offer kayak tour in the Seashore conducted kayak tours in Drakes Estero. A total of 221 visitors to the Seashore participated in kayak tours of Drakes Estero in 2010 (NPS 2010g). However, if commercial shellfish operations in Drakes Estero are terminated and the project area is converted to congressionally designated wilderness area, the demand for kayak tours in Drakes Estero may increase. This could cause more of the authorized operators to offer tours, or additional kayak operators may apply for permits to provide tours in Drakes Estero, which may help to offset the loss of visitors to DBOC. Increased interest in kayaking in Drakes Estero would support the kayak operators, which, in most cases, are local small businesses. The potential increase in commercial kayak tours in Drakes Estero is not likely to noticeably impact the regional economy.

The California Aquaculture PEIR, which is currently being developed, would alter CDFG's management of its leasing program for aquaculture (including commercial shellfish operations) along the coast of California. The PEIR, which is primarily focused on regulatory issues associated with California aquaculture, could result in changes to the total production acreage in the state. Such regulatory changes could alter shellfish production levels. The inclusion of more or less stringent regulations also could lead to reduced or increased shellfish production, respectively. Changes in shellfish production levels could affect local jobs (either create more, or reduce some), profits for local businesses that produce shellfish, and any taxes associated with shellfish production and distribution. At this time, the PEIR is in the initial drafting stages and sufficient information is not available to determine whether production would increase or decrease as a result of PEIR implementation. As such, the potential impact of the PEIR on socioeconomic conditions in Marin County cannot be assessed at this time and is not considered in the overall determination of cumulative impacts on regional socioeconomic resources. The outcome of this planning effort could have beneficial or adverse effects on the statewide shellfish industry.

In an effort to reduce seafood imports and support the U.S. economy, national sustainable marine aquaculture policies have been established by the U.S. Department of Commerce and NOAA (NOAA 2011a). These policies have been specifically designed to support a national approach to sustainable aquaculture that will meet the increased demand for healthy seafood in the United States; support coastal communities, including commercial and recreational fisheries; and restore vital species and habitat. Primary efforts include “encouraging and fostering sustainable aquaculture that increases the value of domestic aquaculture production and creates American business, jobs, and trade opportunities. . . [and] promoting a level playing field for U.S. aquaculture businesses engaged in international trade, working to remove foreign trade barriers, and enforcing our rights under U.S. trade agreements” (NOAA 2011a). The implementation of the aquaculture policy could have a long-term beneficial impact on socioeconomic resources in Marin County, especially in those areas where aquaculture (including commercial shellfish operations) is prevalent.

The current economic recession is having a dampening effect on the national and local economy; however, despite the poor economic conditions, visitation to the Seashore has remained generally steady, declining only 8 percent since 2008. Unemployment rates in both the state and Marin County have increased since 2008 (U.S. Department of Labor 2011). Over time, increasing population and economic opportunities should provide beneficial impacts to the economy of Marin County. Based on the information above, the impact of these past, present, and reasonably foreseeable future actions on the regional economy would be long-term and beneficial. The impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term minor adverse impacts of alternative A would result in a long-term minor adverse cumulative impact on local and regional socioeconomic resources. Alternative A would contribute a noticeable adverse increment to the cumulative impact.

Past, present, and reasonably foreseeable future actions also have the potential to impact shellfish production in California. These actions include the proposed California Aquaculture PEIR, the expansion of commercial shellfish operations in Humboldt Bay, and changes to NOAA aquaculture policies.

As described above, the PEIR is in the initial drafting stages and sufficient information is not available to determine whether production would increase or decrease as a result of PEIR implementation. As such, the potential impact of the PEIR on California aquaculture cannot be assessed at this time and is not considered in the overall determination of cumulative impacts on California shellfish production.

If commercial shellfish operations in Humboldt Bay are expanded, it would allow that region to produce a larger percentage of California’s shellfish. In 2011, the Headwaters Fund awarded a grant to the Humboldt Bay Harbor District to support planning and permitting that could double the areas available to shellfish production in Humboldt Bay. While this grant could facilitate increased production areas, it is unlikely that the available shellfish production areas in Humboldt Bay would double in the foreseeable future. However, if shellfish operations in Drakes Estero cease in 2012, the proposed increase in commercial shellfish operations in Humboldt Bay could help reduce the associated socioeconomic impacts on the statewide oyster and clam production. As such, the expansion of commercial shellfish operations in Humboldt Bay could result in long-term beneficial impacts on statewide shellfish production.

As described relative to regional socioeconomic resources, the primary focus of the new NOAA aquaculture policies includes “encouraging and fostering sustainable aquaculture that increases the value of domestic aquaculture production and creates American business, jobs, and trade opportunities . . . [and]

promoting a level playing field for U.S. aquaculture businesses engaged in international trade, working to remove foreign trade barriers, and enforcing our rights under U.S. trade agreements” (NOAA 2011a). As such, it is anticipated that the implementation of the aquaculture policy would have a long-term beneficial impact on shellfish production in California.

Based on the information above, the impact of these past, present, and reasonably foreseeable future actions on the California shellfish market would be long-term and beneficial. The impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term major adverse impacts of alternative A, would result in a long-term minor adverse cumulative impact on statewide shellfish production. Alternative A would contribute a noticeable adverse increment to the cumulative impact.

Conclusion

Overall, alternative A would result in long-term minor adverse impacts on local and regional socioeconomic resources. DBOC staff and their families would experience a direct adverse impact under alternative A due to the loss of jobs and housing. However, from a regional socioeconomic perspective, these impacts would be minimal and would not affect the overall regional economy. Based on employment, payroll, and revenue, DBOC accounts for 0.006 percent of the total value added in Marin County. DBOC staff composes 0.01 percent of the Marin County population and 2.1 percent of the Inverness population (U.S. Census Bureau 2010). Jobs lost in connection with the closure of DBOC make up only a small percentage of the total labor force for Marin and Sonoma counties and Inverness CDP, and even with the added job loss, assuming these jobs are not replaced by expanded shellfish operations elsewhere, unemployment rates in Marin County and Inverness CDP would be well below statewide averages of 12.4 percent (U.S. Department of Labor 2011). In addition, the relocated households encompass a small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.5 percent of the homes in Inverness CDP) (U.S. Census Bureau 2010). Therefore, even if all former staff relocates to another community and/or county, the impact on the regional economy would be minimal. Additionally, it is assumed that the Seashore, as a whole, would continue to contribute to the regional economy at current levels through local spending (approximately \$85 million in 2010) and by supporting jobs (resulted in \$12 million in added value to the region in 2010) (NPS 2011d). The cumulative impact on the local and regional economy would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.

Alternative A could result in long-term major adverse impacts on California’s shellfish market because DBOC produces 16 to 35 percent of the oysters harvested in California and 13 to 33 percent of the total shellfish grown in the state. The cessation of commercial shellfish operations in Drakes Estero would be readily apparent and could substantially influence the production of shellfish in California. The cumulative impact on the California shellfish market would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the cumulative impact.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for continued commercial shellfish operations in Drakes Estero. Actions associated with this alternative that would have the potential to impact socioeconomic resources include:

- the provision of employment
- the provision of housing
- the cultivation of species including the following:
 - Pacific oysters and Manila clams in Area 1
 - purple-hinged rock scallops in Area 2
- the production of up to 600,000 pounds of shellfish per year

DBOC's operations would be largely unchanged from existing conditions under this alternative. No jobs would be lost as a result of alternative B. Alternative B would provide for the ongoing sale of shellfish and "complementary food items" by DBOC. DBOC would maintain production and distribution of Pacific oyster products with its existing trucks, or comparable replacements, in an approximately 100-mile radius of DBOC. As under current conditions, Manila clams would be sold on site and to select local restaurants due to their limited production (DBOC [Lunny], pers. comm. 2011h). As described under alternative A, approximately 80 to 90 percent of the shellfish produced at DBOC is distributed to the region, composing, between 16 and 35 percent of the California oyster market and between 13 and 33 percent of the overall shellfish market in the state (DBOC [Lunny], pers. comm. 2011h; CDFG 2011a, 2011c, 2011e; PCSGA 2009; Kuiper 2009). DBOC also produces approximately 1 percent of the total Manila clams harvested in California (CDFG 2011a, 2011c). At a countywide, assuming Tomales Bay production remains similar to current levels, DBOC would continue to produce approximately half of the oysters and shellfish in Marin County.

As described under alternative A, DBOC estimates that approximately 50,000 people visit the oyster company annually (DBOC 2010n^{lxxxii}). DBOC visitors also are likely to spend money at local restaurants, shops, and/or hotels/motels, contributing further to the regional economy. However, as described previously, DBOC's specific contribution to the regional, state, and/or local economy could not be determined at the time of report development because data is not available regarding the number of visitors that come to the Seashore for the sole purpose of visiting DBOC (versus those who also visit other areas of the Seashore during their trip). Visitors to DBOC who also come to experience other areas of the Seashore would contribute to the regional, state, and local economy regardless of DBOC's presence, whereas, those who only travel to DBOC may or may not continue to come to the Seashore.

Under this alternative, DBOC contributions to the Marin County economy would be similar to current conditions, as described in chapter 3 of this EIS. Specifically, DBOC would continue to support a total of approximately \$2 million in annual output, \$1.1 million in annual value added, and 35 jobs (MIG 2012). This is approximately 0.006 percent of the county's total value added.

TABLE 4-4. IMPACT SUMMARY – PRODUCTION LIMIT OF 600,000 POUNDS OF SHELLFISH PER YEAR

Impact Type	Employment (Jobs)	Labor Income	Total Value Added	Output
Total Effect	34.9	\$546,025	\$1,117,575	\$2,026,982

Source: MIG 2012; *DBOC 2010^{lxxxvii}

Under alternative B, DBOC would no longer operate under a state water bottom lease from CDFG. As a result, DBOC would not pay some of the fees or taxes that CDFG assesses on shellfish operators. The CDFG administers state water bottom leases and collects revenues from its leaseholder. Lessees pay an annual per acre rental fee and a privilege use tax (\$0.04 per gallon for oysters, \$0.0125 per pound for other shellfish) to the CDFG. Instead, under this alternative, pursuant to section 124 of PL 111-88, DBOC would pay the United States an annual fee based on the fair market value of its use of the onshore and offshore federal property permitted to DBOC. The NPS, through the DOI Office of Valuation Services, completed an appraisal process to determine the fair market value of the project area. The appraisal was conducted in accordance with federal appraisal standards and was used to establish the fair market value of the new permit. In addition, DBOC would continue to pay other state and local taxes associated with its business. However, information related to such taxes was not readily available during EIS preparation.

The existing facilities at DBOC would be generally unchanged under alternative B, including the five housing units (three mobile homes and two permanent wood-frame houses). Staff would not have to relocate. As a result, this alternative would have no impact on housing. Additionally, the staff who live in DBOC housing would maintain their contributions to the regional economy by spending money at local establishments such as restaurants/bars and retailers.

As described above, alternative B would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. No jobs or housing would be lost and both the Seashore and DBOC would continue to contribute to the regional economy at current levels. This alternative would result in a long-term beneficial impact on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market for another 10 years.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on socioeconomic resources. The commercial shellfish operation in Drakes Estero would no longer contribute to the state’s shellfish market and housing and employment would no longer be provided at the site for the current DBOC staff. Impacts on socioeconomic resources associated with conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact socioeconomic resources in the project area and the region. Actions that have the potential to combine with the impacts of alternative B during the 10-year period of the new SUP include ranching operations, kayaking in

Drakes Estero, the proposed California Aquaculture PEIR, the expansion of commercial shellfish operations in Humboldt Bay, changes to NOAA aquaculture policies, and economic trends. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term beneficial impacts of alternative B would result in a long-term beneficial cumulative impact on local and regional socioeconomic resources as well as statewide shellfish production. Alternative B would contribute a noticeable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative B would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially from current levels, and DBOC would continue to provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative B would contribute a noticeable beneficial increment to the cumulative impact.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Actions associated with alternative C that would have the potential to impact socioeconomic resources are the same as those described under alternative B, with the following exceptions:

- the cultivation of species including the following:
 - Pacific oysters in Area 1
 - purple-hinged rock scallops in Area 2
- the production of up to 500,000 pounds of shellfish per year

In 2007/2008, DBOC produced between 16 and 35 percent of the oysters harvested in California and between 13 and 33 percent of the shellfish grown in the state (CDFG 2011a, 2011c, 2011e; PCSGA 2009; Kuiper 2009). During these years, DBOC averaged 451,691 pounds (5.31 million individuals) of Pacific oyster meat, only slightly lower than the 500,000 pound limit proposed under this alternative. As such, if the state shellfish market continues to expand, DBOC's share of statewide oyster production would be reduced. At a countywide level, assuming Tomales Bay production remains similar to current levels, DBOC would continue to produce approximately half of the oysters and shellfish in Marin County.

The production limit associated with this alternative is approximately 85 percent of DBOC production in 2010. As such, an IMPLAN model was run using a proportionate decrease in gross sales to identify the regional economic impacts that would be expected from operations at this level. As described in the

alternative A and B impact analyses, DBOC has requested that financial data be kept confidential. Therefore, separate direct, indirect, and induced impact data generated by the IMPLAN model have been excluded from this EIS. Instead, a summary of the total results is presented above and in table 4-5. The IMPLAN analysis indicated that at production levels of 500,000 pounds of shellfish per year, DBOC would contribute approximately \$1.7 million in annual output and \$0.9 million in annual value added, and 34 jobs to the regional economy (see table 4-5). Based on this information, under alternative C, value added from DBOC operations would make up 0.005 percent of the county total. Despite the decrease from the 2010 production level, and based on DBOC employment figures from 2010, it is not anticipated that jobs would be lost at DBOC under alternative C.

TABLE 4-5. IMPACT SUMMARY – PRODUCTION LIMIT OF 500,000 POUNDS OF SHELLFISH PER YEAR

Impact Type	Employment (Jobs)	Labor Income	Total Value Added	Output
Total Effect	34.3	\$464,121	\$949,938	\$1,722,935

Source: MIG 2012; *DBOC 2010^{xxxiii}

As described under alternative B, the NPS, through the Office of Valuation Services, completed an appraisal process to determine the fair market value of the project area, as directed by section 124 of PL 111-88.

Housing facilities at DBOC would be the same as under alternative B. Staff would not have to relocate under alternative C; therefore, this alternative would not change housing availability for the region or DBOC staff and their families. The staff who live in DBOC housing would maintain their contributions to the regional economy by spending money at local establishments such as restaurants/bars and retailers.

Overall, alternative C would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. No jobs or housing would be lost and both the Seashore and DBOC would continue to contribute to the regional economy at current levels. Although shellfish production at DBOC would be slightly reduced compared to alternative B, this alternative would result in a long-term beneficial impact on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market, with production similar to recent years (2007-2009).

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on socioeconomic resources. Impacts to socioeconomic resources associated with the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact socioeconomic resources in the project area and region. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include ranching operations, kayaking in Drakes

Estero, the proposed California Aquaculture PEIR, the expansion of commercial shellfish operations in Humboldt Bay, changes to NOAA aquaculture policies, and economic trends. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term beneficial impacts of alternative C, would result in a long-term beneficial cumulative impact on local and regional socioeconomic resources and statewide shellfish production. Alternative C would contribute a noticeable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative C would result in long-term beneficial impacts on local, regional, and statewide socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. DBOC would continue to provide employment and housing to DBOC staff and their families. DBOC's contribution to the regional economy would not change substantially, and DBOC would provide a local food source for the region for an additional 10 years in quantities similar to current distribution. Additionally, it is assumed that visitor spending at the Seashore would continue at current levels. The cumulative impact on both the local and regional economy and statewide shellfish production would be long term and beneficial, and alternative C would contribute a noticeable beneficial increment to the cumulative impact.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Actions associated with alternative D that would have the potential to impact socioeconomic resources are the same as those described under alternative B, with the following exceptions:

- an uncertain level of housing for DBOC staff
- the cultivation of shellfish species including the following:
 - Pacific oysters
 - Olympia oysters
 - Manila clams
 - purple-hinged rock scallops
- the production of up to 850,000 pounds of shellfish per year

As with the other action alternatives, under alternative D, DBOC would continue to sell shellfish in a manner similar to current conditions, except diversification of products could occur as follows: in addition to Pacific oyster products, DBOC would produce and distribute Manila clams (currently produced at DBOC but only distributed on site), Olympia oysters (not currently produced at DBOC), and purple-hinged rock scallops (permitted but not currently produced at DBOC). Impacts on socioeconomic resources resulting from the continuation of the commercial shellfish operation for an additional 10 years under alternative D are described as follows.

This alternative would allow DBOC not only to diversify the types of shellfish produced but also to produce up to 850,000 pounds of shellfish per year. When compared to the 2010 reported production of 585,960 pounds (6,885,609 individual oysters and 20,520 individual clams), this alternative would allow an increase of 45 percent. When compared to the production limits established for the other alternatives, alternative D would allow approximately 40 percent more shellfish than under alternative B (production limit set at 600,000 pounds per year) and 70 percent more than under alternative C (production limit set at 500,000 pounds per year). Between 1996 and 2010, shellfish production in California was generally steady, averaging approximately 1.6 million pounds (14.8 million individuals) per year (CDFG 2011c). If statewide shellfish production remains generally steady for the next 10 years, shellfish produced at DBOC could contribute a larger percentage to the state market. However, if the statewide shellfish market expands, DBOC’s share would be similar to current conditions. Similarly, at a countywide level, if Tomales Bay production remains similar to current levels, DBOC could account for a larger percentage of Marin County shellfish production under alternative D. However, shellfish production in Tomales Bay has been steadily increasing since 2007. Therefore, it is likely that even with production increases at DBOC, the operations at Tomales Bay and DBOC would continue to account for approximately half the county’s annual shellfish production each.

The production limit associated with this alternative would be approximately 145 percent of DBOC production in 2010. As such, an IMPLAN model was run using a proportionate increase in gross sales to identify the regional economic impacts that would be expected from operations at this level. As described in the impact analysis for the other alternatives, DBOC has requested that financial data be kept confidential. Therefore, separate direct, indirect, and induced impact data generated by the IMPLAN model have been excluded from this EIS. Instead, a summary of the total results is presented above and in table 4-6. The analysis indicated that at production levels of 850,000 pounds of shellfish per year, DBOC would contribute approximately \$2.9 million in annual output and \$1.6 million in annual value added, and 39 jobs to the regional economy (see table 4-6). Under alternative D, value added from DBOC operations would make up 0.009 percent of the county total.

TABLE 4-6. IMPACT SUMMARY – PRODUCTION LIMIT OF 850,000 POUNDS OF SHELLFISH PER YEAR

Impact Type	Employment (Jobs)	Labor Income	Total Value Added	Output
Total Effect	39.2	\$791,736	\$1,620,483	\$2,939,124

Source: MIG 2012

As described under alternative B, the NPS, through the Office of Valuation Services, completed an appraisal process to determine the fair market value of the project area, as directed by section 124 of PL 111-88.

As detailed in chapter 2, DBOC has submitted two concepts for what expanded development at the site might look like. Under Option 1, the existing housing facilities would remain; therefore, DBOC staff and their families would experience no impact related to housing. However, based on the most recent proposal from DBOC (DBOC 2011g^{lxxxiv}), Option 2 of alternative D would include the removal of the three existing on-site mobile homes and one of the permanent homes. This option would result in housing impacts similar to those described in alternative A. Specifically, alternative D would require the relocation of the 15 DBOC staff and their families who currently live in the on-site mobile homes (DBOC 2010j^{lxxxv}). At the time of report preparation, information pertaining to the total number of residents living

in the mobile homes in the project area was not readily available. As described in alternative A, the removal of these housing units would adversely impact those forced to relocate, but the impacts to the region would be limited.

DBOC acknowledges that its concept drawings do not show any worker housing except a manager's residence (the cabin) and has stated that worker housing may be incorporated into the design in the future (DBOC 2011g^{lxxxvi}). The conceptual analysis provided in this document applies only to on-site development. If DBOC proposes to build housing in the SUP, additional compliance would be required. The construction of DBOC housing would not be permitted outside the SUP.

In addition, as part of alternative D, the NPS would approve expanded onshore development at a conceptual level. The elements of this alternative are based on DBOC proposals to the NPS during the public scoping and alternatives development processes as well as on DBOC's most recent application to the CCC for a coastal development permit (the project description is dated March 3, 2010). The new facilities would provide visitors with the opportunity to view the entire shellfish production process (seed production to shucking and packing) (DBOC 2011g^{lxxxvii}). This improvement to visitor experience (described further in the "Impacts on Visitor Experience and Recreation" section of this chapter) could minimally increase annual visitation to DBOC. The larger interpretive facilities proposed under both options of alternative D could allow DBOC to accommodate larger tour groups. Visitors also would be provided with increased opportunities to experience the stages of shellfish processing in an improved interpretive facility and retail shop. The installation and/or construction of new facilities would increase expenses for DBOC over the short term (i.e., during the construction period) and could reduce net profits for those years. Given the high cost associated with the amount of new construction proposed by DBOC and the fact that the SUP would terminate in 10 years it may not be economically advantageous for DBOC to fund this level of capital investment in an operation that must terminate in 10 years. However, if construction and demolition work occurs under this alternative (e.g., the demolition of the processing plant and construction of a new two-story processing and interpretive facility associated with alternative D, Option 1, or the construction of the new multipurpose building associated with Option 2), alternative D also would create short-term jobs for local workers.

Overall, alternative D would result in long-term beneficial impacts on local and regional socioeconomic resources due to the continued operation of a commercial shellfish facility in Drakes Estero for another 10 years. No jobs would be lost and both the Seashore and DBOC would continue to contribute to the regional economy at current levels. The increased production could support up to two new jobs at DBOC. This alternative would result in a long-term beneficial impact on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market for another 10 years.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on socioeconomic resources. Impacts on socioeconomic resources associated with the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact socioeconomic resources in the project area and the region. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include ranching operations, kayaking in Drakes Estero, the proposed California Aquaculture PEIR, the expansion of commercial shellfish operations in Humboldt Bay, changes to NOAA aquaculture policies, and economic trends. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term and beneficial. The impacts of these past, present, and reasonably foreseeable future actions, combined with the long-term beneficial impacts of alternative D would result in a long-term beneficial cumulative impact on local and regional socioeconomic resources and statewide shellfish production. Alternative D would contribute a noticeable beneficial increment to the overall cumulative impact.

Conclusion

Overall, alternative D would result in long-term beneficial impacts on local and regional socioeconomic resources. Option 1 of alternative D would not change the availability of housing for DBOC staff and their families. In contrast, Option 2 of alternative D, which would include the elimination of four on-site housing units, would have an adverse direct impact on DBOC staff and the families that live on site.

Under both options, DBOC would maintain its contributions to the regional economy in a manner similar to current conditions for an additional 10 years, with some exceptions; however, due to expanded opportunities for product diversification, these contributions could be slightly increased.

The potential for increased shellfish production under alternative D could result in an increase in DBOC staff, providing additional jobs for local workers. Although the new facilities at DBOC could minimally increase visitation to the commercial shellfish operation, it is assumed that visitor spending associated with the Seashore as a whole would continue at current levels.

The relocated households proposed under Option 2 represent a very small percentage of the total households in the surrounding communities (less than 0.01 percent of the housing in Marin County and 0.4 percent of the homes in Inverness CDP) (U.S. Census Bureau 2005-2009). Therefore, even if all DBOC staff who currently reside in on-site housing move to another community and/or county, the impact on the local and regional economy would be minimal. Additionally, some short-term jobs would be created once new onshore facilities are approved by the NPS and developed by DBOC. The cumulative impact on the regional economy would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.

Both Option 1 and Option 2 of alternative D would result in long-term beneficial impacts on shellfish production in California because DBOC would continue to contribute to the statewide shellfish market for an additional 10 years. Additionally, the increased production limits proposed under this alternative would allow DBOC to cultivate more diverse and larger quantities of shellfish, including the purple-hinged rock scallop and the Olympia oyster, which are not currently produced at DBOC. These increased production limits could result in DBOC increasing its contribution to the California shellfish market. The

cumulative impact on statewide shellfish production would be long term and beneficial, and alternative D would contribute a noticeable beneficial increment to the cumulative impact.

IMPACTS ON NPS OPERATIONS

LAWS AND POLICIES

Direction for management and operations at the Seashore is set forth in *NPS Management Policies 2006* (NPS 2006d), the Seashore's business plan (NPS 2007b), and the Seashore's GMP (NPS 1980). The 2007 business plan identifies and describes the roles of each of the Seashore's five operational functions: management and administration, facility operations and maintenance, law enforcement and visitor safety, resource management, and visitor experience and recreation.

METHODOLOGY

The area of analysis for NPS operations is the boundary of the Seashore. NPS management and operations, for the purpose of this analysis, refer to the quality and effectiveness of NPS staff to maintain and administer Seashore resources and provide for an appropriate visitor experience. This section includes an analysis of the projected need for staff time and materials in relationship to each of the alternatives. The analysis also considers trade-offs for staff time or the budgetary needs required to accomplish the proposed alternatives. NPS staff were consulted regarding expected staffing and funding needs under each alternative. The impact analysis is based on the current description of NPS operations presented in "Chapter 3: Affected Environment". The required level of effort is discussed in terms of "full-time equivalent," or FTE, which represents the hours worked by staff. One FTE equals 2,080 hours, the equivalent of one person working full time year-round, or two part-time staff each working six months of the year. FTE estimates provided in this section reflect anticipated levels of staffing for specific activities associated with each alternative, as well as differing levels of planning, oversight, and enforcement. This section includes an analysis of both direct and indirect impacts, and considers them over the long-term and short-term.

Intensity Definitions

Negligible:	The impact is not detectable or measurable.
Minor:	Impacts would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore.
Moderate:	Impacts would be readily apparent and could appreciably obstruct the ability of the NPS to provide services, manage resources, and/or operate the Seashore.
Major:	Impacts would be readily apparent and would potentially have a permanent influence on the ability of the NPS to provide services, manage resources, and/or operate the Seashore.

IMPACTS OF ALTERNATIVE A

Impact Analysis

Under alternative A, the existing authorizations for DBOC operations expire on November 30, 2012. DBOC operations would cease, and DBOC would be responsible for the removal of certain buildings and structures and all personal property (including infrastructure related to commercial shellfish operations in Drakes Estero, cultivated shellfish, and any improvements made to the area since 1972).

In addition, under alternative A, baseline surveys and resource monitoring would occur to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, Manila clams, Olympia oyster, etc.) and eelgrass. These surveys and monitoring results would provide site-specific data and lead to a better understanding of the natural ecological processes in Drakes Estero, thus improving the long-term management of Drakes Estero. It is estimated that two new six-month seasonal positions would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness.

NPS oversight of the closeout of DBOC operations, the removal of personal property and designated structures, and the conversion to wilderness would include personnel to monitor closeout procedures and initiate ongoing wilderness monitoring and management efforts. Existing staff efforts associated with the Seashore visitor facilities, including the Seashore road, parking area, and vault toilet, would remain at current levels. The NPS would continue to maintain the existing facilities (a gravel parking lot, a vault toilet, and an interpretive board) for visitors wishing to use Drakes Estero under this alternative. FTE and support costs associated with the continued maintenance of these facilities would be similar to current efforts. However, administrative commitments (cost and time) related to DBOC management, including negotiation, oversight, and compliance for the SUP, would be reduced under this alternative. The annual closure of Drakes Estero to recreational boaters for harbor seal pupping season would remain in effect between March 1 and June 30, and under this alternative, a gate would be installed at the intersection of the existing access road with Sir Francis Drake Boulevard to prevent unauthorized boat access to Drakes Estero during pupping season. The public would still be allowed to access the shoreline areas of Drakes Estero.

During the removal of DBOC personal property and closeout of the site operations, existing NPS staff would provide oversight and support. Contractors may be required to ensure the protection of sensitive natural and cultural resource areas during this time. In the long term, increased Seashore law enforcement patrols would be required to monitor the former DBOC property and to enforce the boat closure periods.

Overall, alternative A would result in long-term minor adverse impacts on NPS operations due to efforts associated with monitoring Drakes Estero during boat closure periods and enforcing the closures. These impacts would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact NPS operations at the Seashore. These actions include the restoration of the onshore developed area following SUP expiration,

monitoring/managing invasive species, actions under the existing fire management plan, moving the vault toilet out of the flood hazard area, planning and management activities, and coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project).

Although no specific restoration plan for this site has been developed, the NPS would undertake actions to maintain and restore natural conditions at the developed onshore area. Such restoration efforts would be conducted by shifting the efforts currently dedicated to existing administration and management associated with Drakes Estero to planning for restoration purposes. Any restoration efforts and interpretive improvements aside from existing plans would be subject to separate NEPA review and would not result in any changes to existing staffing. Researchers would continue to be allowed to apply for an NPS permit to conduct research in Drakes Estero. Management and administration resources associated with these permit applications would be similar to current levels of effort and would not impact NPS operations.

Planning and management activities would result in short-term increases in management and administration resources to coordinate planning efforts and develop planning documents. The implementation of these plans also would likely result in a short-term increase in resource management staff to manage project logistics and ensure the protection and preservation of natural and cultural resources.

Other management activities, such as the fire management plan, and moving the vault toilet out of the flood hazard area would have similar impacts. Ongoing monitoring of projects such as coastal watershed restoration projects would result in short-term, minor, adverse impacts on resource management staff from implementing and monitoring restoration activities. Ongoing activities such as regular trail maintenance would continue.

Based on the information above, the impacts of past, present, and reasonably foreseeable future actions would be short-term and long-term, minor, adverse. The impacts of these past, present, and reasonably foreseeable future actions, when combined with the long-term minor and adverse impacts of alternative A, would result in a long-term minor adverse cumulative impact on NPS operations. Alternative A would contribute a noticeable adverse increment to the cumulative impact.

Conclusion

Overall, alternative A would result in long-term minor adverse impacts on NPS operations because impacts would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore. Although existing NPS staff would be required for monitoring and enforcement during the Drakes Estero boat closure period, the installation of an access gate would increase effectiveness of the closure and further protect harbor seal pupping habitat. Two new part-time (seasonal) positions also would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These efforts would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative A would contribute a noticeable adverse increment to the overall cumulative impact.

IMPACTS OF ALTERNATIVE B

Impact Analysis

Under alternative B, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact NPS operations include:

- NPS administration of DBOC operations and facilities
- The maintenance of NPS facilities in the project area

DBOC would be required to pay fair market value for the use of federal property, which includes onshore and offshore areas in the permit boundaries. The NPS would evaluate future requests regarding operational and infrastructure changes from DBOC for consistency with the intent of this alternative, which is to maintain existing conditions. As a condition of issuance of the SUP, DBOC would surrender its CDFG lease and the NPS SUP would be the only authorization governing the operation. The NPS would oversee and enforce all aspects of the land use operations in the permit area. To effectively manage the SUP, the NPS would establish a staff position to coordinate Seashore oversight, management, and enforcement of the existing operations. This position also would be responsible for assisting with documentation of monitoring and mitigation efforts prescribed for this alternative.

Consistent with the Fish and Game Code, DBOC would be required to maintain an aquaculture registration with CDFG, and CDFG would maintain jurisdiction over the importation of aquatic organisms from other states. As described in chapter 1, pursuant to Division 12 of the Fish and Game Code, CDFG is responsible for regulating the stocking of aquatic organisms, brood stock acquisition, disease control, and the importation of aquatic organisms into the state. CDFG also collects payments from aquaculture operators, including an annual lease fee based on the number of acres included in the lease and privilege use taxes, which are based on the gallons of shellfish produced as reported by monthly statements. CDPH would maintain all responsibilities associated with shellfish water quality and production monitoring and management.

As under current conditions, NPS would continue to enforce the closure of Drakes Estero to recreational boaters annually between March 1 and June 30 for the harbor seal pupping season. Only DBOC would be allowed to use boats in Drakes Estero during this four-month period, subject to the SUP. As part of the increased coordination, the NPS would increase the enforcement of the closure to reduce the potential disturbance of harbor seals by nonmotorized recreational boaters. DBOC would only operate in the permit area. No boat operations would be authorized outside the permit area without approval by NPS. Current facilities and operations at DBOC would be generally unchanged from existing conditions. As under current conditions, under the new SUP DBOC would be required to maintain safe facilities. NPS would work with DBOC to bring all existing operations and facilities into compliance with the SUP. Any modifications or expansion of existing facilities at DBOC also would be subject to NPS review and approval.

Existing staff efforts associated with the Seashore visitor facilities, including the Seashore access road, parking area, and vault toilet, would remain at current levels. The NPS would continue to maintain the existing facilities (a gravel parking lot, a vault toilet, and an interpretive board) for visitors wishing to use Drakes Estero under this alternative. FTE and support costs associated with continued maintenance of

these facilities would be similar to current efforts. The annual closure of Drakes Estero to recreational boaters for harbor seal pupping season would remain in effect between March 1 and June 30.

As discussed above, the issuance of a permit under alternative B would require a dedicated staff position to provide oversight and coordinate enforcement of the SUP, resulting in long-term minor adverse impacts on NPS operations because this impact would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore. In addition, as described under alternative A, this alternative would include continued monitoring of invasive species in the Seashore. It is estimated that two six-month seasonal positions would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. The addition of these positions would result in long-term minor adverse impacts on NPS operations because the impact would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on NPS operations in Drakes Estero. Impacts on NPS operations associated with the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact NPS operations at the Seashore. These actions include the existing fire management plan, moving the vault toilet out of the flood hazard area, planning and management activities, and coastal watershed restoration projects (Geomorphologic Restoration Project and Drakes Estero Road Crossing Improvement Project), as described under alternative A. For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term, minor, and adverse. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative B, would result in a long-term minor adverse cumulative impact on NPS operations. Alternative B would contribute a noticeable adverse increment to the cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of the onshore developed area, cumulative impacts beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A, with one noteworthy exception. Although shellfish operations would cease in 2022, the additional 10 years of nonnative shellfish cultivation in Drakes Estero under alternative B may allow these shellfish species to become further established in the Drakes Estero benthic community (purple-hinged rock scallop may be native in larval form, but is not typically found in adult form in soft-bottom estuaries such as Drakes Estero). The continued commercial shellfish operations would also continue to provide a hard substrate upon which *Didemnum* may continue to grow. Prolonging the presence of these nonnative shellfish and associated infrastructure under alternative B could hinder NPS efforts at invasive species management in Drakes Estero and could increase the level of effort required for assessment and monitoring, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite the cessation of the shellfish operation.

Conclusion

Overall, alternative B would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP. In addition, two half-time (seasonal) positions would conduct monitoring and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative B would contribute a noticeable adverse increment to the overall cumulative impact.

IMPACTS OF ALTERNATIVE C

Impact Analysis

Under alternative C, NPS would issue a new SUP to DBOC for a period of 10 years for commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact NPS operations are the same as those described under alternative B. The offshore SUP boundaries would be modified to a smaller area; however, DBOC's racks and bags would occupy the same space as under alternative B. The change in production limit (from 600,000 pounds per year under alternative B to 500,000 pounds per year under alternative C) would also not be expected to result in any difference in impacts.

Under alternative C, impacts on NPS operations would be the same as described under alternative B. To effectively manage the SUP, NPS would establish one FTE position to coordinate Seashore oversight and enforcement for the existing operations. Existing staff efforts associated with the Seashore visitor facilities, including the Seashore access road, parking area, and vault toilet would remain at current levels and would be the same as described under alternative B.

As described above, the issuance of a new permit under alternative C would require one dedicated staff position to provide oversight and coordinate enforcement of the SUP, resulting in a long-term minor adverse impact on NPS operations because this impact would be slightly detectable but would not obstruct the overall ability of the NPS to provide services, manage resources, or operate the Seashore. Similar to the other alternatives, and as described under alternative A, two six-month seasonal positions would be required to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. The addition of these positions would result in long-term minor adverse impacts on NPS operations because the impact would be slightly detectable but would not hinder the overall ability of the NPS to provide services, manage resources, or operate the Seashore.

Similar to the other action alternatives, upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on NPS operations in Drakes Estero. Impacts on NPS operations associated with the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact NPS operations at the Seashore. Actions that have the potential to combine with the impacts of alternative C during the 10-year period of the new SUP include actions under the existing fire management plan, moving the vault toilet out of the flood hazard area, planning and management activities, and coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project). For the same reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term, minor, and adverse. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term, minor, adverse impacts of alternative C, would result in long-term, minor, adverse cumulative impacts. Alternative C would contribute a noticeable adverse increment to the overall cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of the onshore developed area, cumulative impacts beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A, with one noteworthy exception. Although shellfish operations would cease in 2022, the additional 10 years of nonnative shellfish cultivation in Drakes Estero under alternative C may allow these shellfish species to become further established in the Drakes Estero benthic community (purple-hinged rock scallop may be native in larval form, but is not typically found in adult form soft-bottom estuaries such as Drakes Estero). The commercial shellfish operation would also continue to provide a hard substrate upon which *Didemnum* may continue to grow. Prolonging the presence of these nonnative shellfish and associated infrastructure under alternative C could hinder NPS efforts at invasive species management in Drakes Estero and could increase the level of effort required for monitoring and management, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite the cessation of the shellfish operation.

Conclusion

Overall, alternative C would result in a long-term minor adverse impact on NPS operations because this alternative would require the establishment of one FTE position to manage and oversee all aspects of the SUP and two part-time (seasonal) staff who would assess, monitor, and manage invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact would be long term, minor, and adverse, and alternative C would contribute a noticeable adverse increment to the overall cumulative impact.

IMPACTS OF ALTERNATIVE D

Impact Analysis

Under alternative D, NPS would issue a new SUP to DBOC for a period of 10 years for continued commercial shellfish operations in and adjacent to Drakes Estero. Actions associated with this alternative that would have the potential to impact NPS operations are the same as those described under

alternative B, with a few exceptions. Differences from alternative B that would have the potential to impact NPS operations include

- an increased production limit
- new onshore development

Under this alternative, the NPS would consider new onshore development through a tiered, but separate, NEPA process. Alternative D includes concepts for two potential design approaches. Any structures built by DBOC under alternative D would be considered personal property and their removal would be required upon expiration of the permit in 2022. Alternative D would cap production levels at 850,000 pounds of shellfish per year, which is a noteworthy increase over alternatives B (600,000 pounds per year) and C (500,000 pounds per year).

Under alternative D, there would be some level of demolition of existing structures and construction of new structures in the onshore permit boundaries. However, the existing NPS facilities and associated operations at the project site would be generally unchanged under alternative D. As described under the other action alternatives, the new SUP would include the condition that DBOC must maintain safe facilities. NPS would work with DBOC to bring all existing operations and facilities into compliance with the SUP. Any modifications or expansion of existing facilities at DBOC also would be subject to NPS review and approval. The issuance of a permit under alternative D would require one FTE staff position to provide oversight and coordinate enforcement of the SUP, two half-time FTEs to assess and monitor invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness, and an additional 2-year planning position to coordinate NEPA compliance for the proposed onshore development as well as ensure any site specific permitting requirements are met.

Existing staff efforts associated with the Seashore visitor facilities, including the Seashore access road, parking area, and vault toilet, would remain at current levels, as under alternatives B and C.

As described above, alternative D would result in long-term minor adverse impacts on NPS operations because the establishment of two dedicated planning and oversight positions, as well as field oversight, would be slightly detectable but would not obstruct the overall ability of the NPS to provide services, manage resources, or operate the Seashore.

Upon expiration of the SUP in 2022, the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would result in changes in impacts on NPS operations in Drakes Estero. Impacts on NPS operations associated with the conversion of the site from congressionally designated potential wilderness to congressionally designated wilderness would be similar to those described under alternative A.

Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact NPS operations at the Seashore. Actions that have the potential to combine with the impacts of alternative D during the 10-year period of the new SUP include actions under the existing fire management plan, moving the vault toilet out of the flood hazard area, planning and management activities, and coastal watershed restoration projects (Geomorphic Restoration Project and Drakes Estero Road Crossing Improvement Project). For the same

reasons discussed in the cumulative impact analysis for alternative A, the impacts of these past, present, and reasonably foreseeable future actions would be long-term, minor, and adverse. The impact of these past, present, and reasonably foreseeable future actions, when combined with the long-term minor adverse impacts of alternative D would result in a long-term minor adverse cumulative impact on NPS operations. Alternative D would contribute a noticeable adverse increment to the cumulative impact.

Due to the discontinuation of DBOC operations in 2022 and the restoration of the onshore developed areas, cumulative impacts beyond 2022 would be expected to be similar to the cumulative impacts described under alternative A, with one noteworthy exception. Although shellfish operations would cease in 2022, the additional 10 years of nonnative shellfish cultivation in Drakes Estero under alternative D may allow these shellfish species to become further established in the Drakes Estero benthic community (purple-hinged rock scallop may be native in larval form, but is not typically found in adult form in soft-bottom estuaries such as Drakes Estero). The commercial shellfish operations would also continue to provide a hard substrate upon which *Didemnum* may continue to grow. Prolonging the presence of these nonnative shellfish and associated infrastructure under alternative D could hinder NPS efforts at invasive species management in Drakes Estero and could increase the level of effort required for monitoring and management, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite the cessation of the shellfish operation.

Conclusion

Overall, alternative D would result in long-term minor adverse impacts on NPS operations because this alternative would require the establishment of one dedicated FTE position to coordinate Seashore oversight and enforcement of all aspects of the SUP. The NPS would oversee and enforce all aspects of the operation in the permit area. Construction on new onshore facilities also would require one 2-year planning position to oversee additional planning and compliance associated with the proposed onshore development evaluated at the conceptual level in alternative D. The staff increase under alternative D also would include two half-time FTEs who would conduct assessment, monitoring, and management of invasive species and other resources of concern in the Drakes Estero portion of the Phillip Burton Wilderness. These impacts would be slightly detectable but would not hinder the overall ability of NPS to provide services, manage resources, or operate the Seashore. The cumulative impact on NPS operations would be long term, minor, and adverse, and alternative D would contribute a noticeable adverse increment to the cumulative impact.

SUMMARY OF IMPACT ANALYSIS

SUSTAINABILITY AND LONG-TERM MANAGEMENT

The NPS is required to consider the relationship between short term uses of the environment and the maintenance and enhancement of long-term productivity (NEPA section 102(2)(C)(iv)). In doing so, the NPS considers the long-term impacts of its actions, and whether its actions involve tradeoffs between immediate use of resources and long-term productivity and sustainability of resources.

Alternative A would support the long-term protection of the Seashore's natural resources by supporting the recovery of the natural ecosystem and all other values for which Drakes Estero was designated by Congress as potential wilderness and for which the Seashore was established. The Seashore is highly valued for its natural setting, especially due to its proximity to the highly developed and densely populated San Francisco Bay Area. The enabling legislation established the Seashore "to save and preserve, for purposes of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the U.S. that remains undeveloped" (PL 87-657). Under alternative A, a new SUP would not be issued and recovery of the natural ecosystem would begin immediately after shellfish operations ceased. This would enhance the sustainability of Seashore resources by supporting long-term ecosystem protection, support natural ecosystem recovery, and provide desirable conditions for restoration.

Alternatives B, C and D would allow for an additional 10 years of commercial shellfish production, which would be a productive use and would provide benefits to the public by producing between 500,000 and 850,000 pounds of shellfish for local consumption and generating income for the local economy. The cultivation of nonnative species for this additional 10 year period poses a risk, however, that these species could establish naturally breeding populations in Drakes Estero. Further, the continued use of offshore infrastructure would maintain the potential for *Didemnum* expansion, and associated activities (such as infrastructure maintenance, vessel traffic, and harvesting) would pose a risk for further dispersal of this nonnative invasive tunicate. However, these alternatives would allow continued commercial use and development instead of restoration for "purposes of public recreational, benefit, and inspiration," as called for in the Seashore's enabling legislation.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

The NPS is required to consider if its actions involve an irreversible or irretrievable commitment of resources (NEPA section 102[c][v]). A resource commitment is considered irreversible if it involves use of and impacts to a non-renewable resource (or a resource renewable only over a long period of time) such that future options for use of that resource are limited. A resource commitment is considered irretrievable if it involves consumption of resources not renewable or recoverable for future use.

None of the alternatives would result in an irreversible or irretrievable commitment of resources beyond that associated with carrying out Seashore management activities (under all alternatives) or commercial shellfish production operations (for alternatives B, C and D), such as limited amounts of fuel and materials consumption.

Alternatives B, C and D have the potential to result in an irreversible commitment of resources due to the continued risk of nonnative species, especially Manila clam (except under alternative C – as cultivation of Manila clam would be prohibited), becoming established in Drakes Estero and the risk of continued spread of *Didemnum*. If these nonnative species cannot be controlled, it would represent an irreversible loss of an otherwise natural ecosystem in Drakes Estero.

UNAVOIDABLE ADVERSE IMPACTS

The NPS is required to consider if the alternative actions would result in impacts that could not be fully mitigated or avoided (NEPA section 102[c][ii]).

Under alternative A, there would be a long-term unavoidable adverse impact on socioeconomic resources due to the reduction in statewide shellfish production. Although no actions associated with this project would mitigate this adverse impact, there is the potential for actions outside this project, such as a potential increase in production levels at other California commercial shellfish operations, to mitigate this loss in statewide shellfish production.

Alternatives B, C and D would result in long-term unavoidable adverse impacts on eelgrass, wetlands, wildlife and wildlife habitat (benthic fauna, fish, and birds) due to continued disturbance of sediments in Drakes Estero by another 10 years of DBOC motorboat use. This use also would continue to damage eelgrass plants, which are a component of a vegetated wetland type and which would continue to have indirect but unavoidable adverse impacts on fish habitat. Long-term unavoidable adverse impacts to benthic fauna also would result from the continued cultivation of nonnative species (Pacific oysters and Manila clams – except under alternative C, as clams would be prohibited) in Drakes Estero. The cultivation of these species for an additional 10 years not only provides a continued risk that these nonnative species could establish naturally breeding populations in Drakes Estero, but also provides a large amount of hard substrate on which the invasive tunicate *Didemnum* can grow and continue to spread. This may, in turn, result in long-term unavoidable adverse impacts on eelgrass. Continued use of motorboats and other noise-producing equipment, as well as maintenance of shellfish growing structures in Drakes Estero, would continue to disrupt biological activity of birds, such as foraging and resting behavior, potentially leading to a reduction in fitness and reproductive success. Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance.

Alternatives B, C, and D would also result in long-term unavoidable adverse impacts on the natural soundscape due to continued DBOC use of noise-generating equipment for an additional 10 years. Human-caused noise emanating from DBOC equipment (e.g., pneumatic drill, oyster tumbler, heavy machinery, trucks, and motorboats) would result in long-term unavoidable adverse impacts on wildlife such as birds and harbor seals and visitor experience and recreation.

Lastly, the continued maintenance of nonconforming structures and uses under alternatives B, C and D in a congressionally designated potential wilderness area would prevent conversion to congressionally designated wilderness for an additional 10 years, a long-term unavoidable adverse impact on wilderness.

ENDNOTES

- i. DBOC 2011d, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, 2011, regarding boat parking and floating dock area dredging.

“The area of shell debris removal is approximately 60’ x 30’. The depth of the dredging in this area will vary from 0’0” to approximately 3’0” near the pier. The approximate total volume of dredged material is approximately 100 cubic yards.”

- ii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero. ... DBOC began with three boats in operation at one time, then reduced to two boats, and currently uses three boats again. Albeit unusual, all boats can be in the Estero all day. Sometimes, boat use is required 7 days a week. On other days, no boats enter the estero at all. As a working farm, DBOC must work around tides, weather, day length, planting season, high demand occasions, etc. The oyster farm has always operated with these variable demands and will continue to in the future.”

- iii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero. ... DBOC began with three boats in operation at one time, then reduced to two boats, and currently uses three boats again. Albeit unusual, all boats can be in the Estero all day. Sometimes, boat use is required 7 days a week. On other days, no boats enter the estero at all. As a working farm, DBOC must work around tides, weather, day length, planting season, high demand occasions, etc. The oyster farm has always operated with these variable demands and will continue to in the future.”

- iv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors.”

- v. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The seawater intake will be comprised of 2 – 4” black, high density polyethylene, fusion welded pipes, side by side. Two pipes will be used so that bio-fouling inside the pipes can be controlled. Only one pipe will be used at a time. The other pipe will be plugged while not in use. During the time of non-use, the fouling organisms in the idle pipeline will die, thereby allowing for full flow while pipe is in use. The intake will be screened using ¼” mesh screen with 16 square feet of surface area. The flow rate through the intake screen is .005 feet per second (attachment 3.m.1). The pipes will be installed side by side on the Estero bottom. The pipes will be anchored using two concrete anchors (attachment 3.f.1) every 100 feet. The anchors will be buried by hand on each side of the pipelines. The pipes will be fastened securely to the anchors with 3/8” stainless steel cable. The pipes will remain full of water at all times. The intake screen will be located approximately 2’ above the bottom of the Estero and will be marked with a buoy secured with a concrete anchor. The intake screen will be maintained approximately two times per year. DBOC previously provided a map showing the proposed location of the seawater intake lines to CCC and NPS.”

vi. Wechsler 2004, 13: "Aquatic macrophytes, primarily eelgrass (*Zostera marina*) beds, were the predominant form of subtidal and intertidal biological material in Drakes Estero."

vii. Anima 1991, 42: "In Schooner Bay the channel is somewhat artificial in that it has been scoured out by the constant boat traffic from the oyster operation."

viii. Wechsler 2004, 29: "eelgrass growth is restricted directly beneath the oyster racks due to light attenuation."

ix. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"Purple hinged rock scallops have traditionally been raised in Drakes Estero using floating racks, floating trays and lantern nets. DBOC plans to continue to culture these native scallops using similar techniques."

xi. Harbin-Ireland 2004, 35: "The relative abundance of ostracods and bivalves approximately doubles between zero and 50 meters. In addition, the relative abundance of tanaids more than doubles between zero and 10 meters."

xii. Harbin-Ireland 2004, 35: "Possible explanations for decreased abundance below oyster racks include increased predation by fish and decapods attracted to oyster cultivation sties by the high densities of oysters (Castel et al. 1989), in addition to the potential inhibition of predatory efficiency in areas of dense eelgrass cover (i.e., control areas) due to the presence of blades and roots which inhibit foraging benthos."

xiii. Harbin-Ireland 2004, 27: "The decrease in silt content values beneath racks in this study may indicate some sediment erosion is taking place due to the presence of the racks; however the difference...is not likely great enough to alter invertebrate community composition..."

xiv. DBOC 2012c, Letter from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on May 7, regarding Coastal Development Permit Application No: 2-06-003.

"Purple hinged rock scallops have traditionally been raised in Drakes Estero using floating racks, floating trays and lantern nets. DBOC plans to continue to culture these native scallops using similar techniques."

xv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"DBOC occasionally uses cinder blocks as anchors as well as the PVC pipe anchors. DBOC also uses larger concrete anchors."

xvii. Anima 1991, 42: "In Schooner Bay the channel is somewhat artificial in that it has been scoured out by the constant boat traffic from the oyster operation."

xviii. Wechsler 2004, 34: "Appendix A. List of all species captured during the Drakes Estero Ichthyofauna – Oyster Mariculture Study, Drakes Estero, Point Reyes National Seashore."

xix. Wechsler 2004, 34: "Appendix A. List of all species captured during the Drakes Estero Ichthyofauna – Oyster Mariculture Study, Drakes Estero, Point Reyes National Seashore."

xx. Wechsler 2004, 18: "Five species, topsmelt (*Atherinopsis affinis*), three-spined stickleback (*Gasterosteus aculeatus*), staghorn sculpin (*Leptocottus armatus*), bay pipefish (*Sygnathus leptorhynchus*), and kelp surfperch (*Brachyistius frenatus*) dominated the fish assemblage and accounted for eighty-nine percent of the total catch (Table 3)."

xxi. Wechsler 2004, 27: "Analysis of variance tests showed no significant difference in species abundance or species richness at Schooner Adjacent, Schooner Away, or Estero de Limantour."

xxii. Wechsler 2004, 19: "This trend reemphasizes a possible shift in the fish assemblage to a group of species capable of taking advantage of the rack structure in the water."

xxiv. Wechsler 2004, 19: "Table 3. Relative abundance of the fish species captured during the Drakes Estero Ichthyofauna – Oyster Mariculture study, Point Reyes National Seashore, December 2002 – January 2004."

xxv. Wechsler 2004, 20-21: "Calculated ANOVA values indicated that there were no significant difference in the abundance of fish over time ($F=0.55$, $p=0.01$) or among sites ($F=0.23$, $p=0.01$) between Schooner Adjacent, Schooner Away, and Estero de Limantour. There were also no significant differences in the number of species captures ($F=1.07$, $p=0.01$) or number of species among sites ($F=0.16$, $p=0.01$) during this study (Table 4)."

xxvi. Wechsler 2004, 21: "Four of the five similarity tests (Renkonen Percent Similarity, Euclidian Distance, Bray-Curtis Index, Morista Index) indicated that the fish communities near Schooner Adjacent and in Estero de Limantour were the most compositionally divergent (Table 5)."

xxvii. Wechsler 2004, 27: "Four of the five similarity indices used to assess the similarity of the fish assemblages showed the greatest compositional divergence was between Estero de Limantour and Schooner Adjacent. This suggested that the use of the artificial habitat derived from mariculture facilities attracted opportunistic fish species to the racks if they provide resources not otherwise available, or supplemented preexisting conditions."

xxviii. Wechsler 2004, 24: "Juvenile fish were captured in the estero throughout this study, which indicated that the estero fulfills a substantial nursery function (Table 7)."

xxix. Wechsler 2004, 22-23: "Of the predominant benthic feeding species, speckled sanddab (*C. stigmaeus*), woolly sculpin (*C. analis*), and leopard sharks (*T. semifasciata*) were captured more frequently in Schooner Adjacent."

xxx. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxiii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxiv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxv. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero. ... DBOC began with three boats in operation at one time, then reduced to two boats, and currently uses three boats again. Albeit unusual, all boats can be in the Estero all day. Sometimes, boat use is required 7 days a week. On other days, no boats enter the estero at all. As a working farm, DBOC must work around tides, weather, day length, planting season, high demand occasions, etc. The oyster farm has always operated with these variable demands and will continue to in the future."

xxxvi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxvii. Wechsler 2004, 30. "The calm nutrient-rich waters of Drakes Estero provide ample nursery and rearing habitat for marine fishes. This protected environment likely provides numerous feed, spawning, and predator avoidance opportunities not otherwise available in Drakes Bay or the Pacific Ocean."

xxxviii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xxxix. Wechsler 2004, 30. "The calm nutrient-rich waters of Drakes Estero provide ample nursery and rearing habitat for marine fishes. This protected environment likely provides numerous feed, spawning, and predator avoidance opportunities not otherwise available in Drakes Bay or the Pacific Ocean."

xl. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xli. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following."

xlii . Anima 1990. 41. "The estero is defined as a coastal lagoon because of the minimal influx and dilution of sea water by fresh water."

xliii. Anima 1990, 42. "The tides in the study area are semidiurnal with a tidal range of between -2.0 to 2.2 meters in Drakes Estero."

xliv . Wechsler 2004, 12. "The estero is mesotidal with semidiurnal tides that range between approximately 0.6-meters below and 2.13-meters above mean sea level."

xl. Wechsler 2004. 12-13. "The high width to depth ratio combined with a large exchange volume results in a well-mixed water body with no stratification."

xlvi. Wechsler 2004, Appendices B and C.

xlvii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"The time the oysters are kept on the beaches varies – up to about 9 months, turned about every month or two."

xlviii. Wechsler 2004, 12-13. "The high width to depth ratio combined with a large exchange volume results in a well-mixed water body with no stratification."

xlix. Wechsler 2004. Appendices B and C.

I. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service's April 2012 questions.

"The time the oysters are kept on the beaches varies – up to about 9 months, turned about every month or two. ... Only about 2 months of beach hardening is necessary, but because of current limited rack space, oysters are removed much sooner to allow for new seed."

li. Wechsler 2004. Appendices B and C.

lii. Wechsler 2004. Appendices B and C.

liii. DBOC 2012b. Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"DBOC typically uses the areas in and around the racks for the floating bag culture. Currently, racks that are in poor condition and cannot support strings are used for floating bags. In these cases, the existing posts are used as anchors. Sometimes, the bags are floating between racks, using the racks as anchors. Other floating systems near the racks are secured by concrete anchors."

liv. DBOC 2012b. Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"When DBOC is allowed to resume the rack repairs, and more racks are again available, the oysters can remain on the racks for a longer period of time and on the beaches for a shorter time."

lv. Anima 1990. Pages 66 – 71.

lvi. Anima 1990. "The results can be compared to the National Academy of Sciences National Academy of Engineering (1973) recommended safe level of 1.0 mg/kg (sum) DDT (the sum of DDD, DDE, and DDT) wet weight for the protection of fish-eating wildlife."

lvii. DBOC 2012b. Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

"DBOC typically uses the areas in and around the racks for the floating bag culture. Currently, racks that are in poor condition and cannot support strings are used for floating bags. In these cases, the existing posts are used as anchors. Sometimes, the bags are floating between racks, using the racks as anchors. Other floating systems near the racks are secured by concrete anchors."

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“When DBOC is allowed to resume the rack repairs, and more racks are again available, the oysters can remain on the racks for a longer period of time and on the beaches for a shorter time.”

lix. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, 2012, regarding DBOC responses to the National Park Service’s April 2012 questions.

“The description of boat operations in the NAS report and the conversations between DBOC staff and VHB/NPS staff generally describes the current boat use in Drakes Estero. ... DBOC began with three boats in operation at one time, then reduced to two boats, and currently uses three boats again. Albeit unusual, all boats can be in the Estero all day. Sometimes, boat use is required 7 days a week. On other days, no boats enter the estero at all. As a working farm, DBOC must work around tides, weather, day length, planting season, high demand occasions, etc. The oyster farm has always operated with these variable demands and will continue to in the future.”

lx. NPS 2004d, Letter from Point Reyes National Seashore Superintendent to Executive Director Fish and Game Commission, on June 18, 2004, regarding California Department of Fish and Game lease renewal.

“As we discussed at our last meeting, we are enclosing copies of the legal opinions from our Solicitor’s Office about the aquaculture activities of Tom Johnson for your perusal.”

lxi. CDFG 2004a, Letter from Marine Region Aquaculture Coordinator to Johnson Oyster Company on February 2, regarding lease renewal.

“Based on information from Don Neubacher, Superintendent, Point Reyes National Seashore, your existing federal lease will terminate in 2012. At that time the leased land will revert to wilderness designation and your non-conforming use will not be permitted thereafter.”

lxii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service’s April 2012 questions.

“Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following.”

lxiii. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.”

lxiv. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.”

lxv. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on National Park Service Draft Environmental Impact Statement for Special Use Permit.

““DBOC is the only farm of any kind in PRNS permitted to provide visitor and interpretive services to the visiting public. Without DBOC, Seashore visitors would completely lose any opportunity for services and interpretation in the Pastoral Zone or PRNS.”

Ixvi. Cummings 2011, Letter from Ginny Lunny Cummings to Point Reyes National Seashore on December 7, 2011 regarding public comments on the National Park Service Draft Environmental Impact Statement Special Use Permit.

“Many [visitors] tell us they come to PRNS only to visit the oyster farm, not to hike, kayak, bird watch, visit beaches or the lighthouse or to whale watch. Rather, these visitors enjoy picnicking with family and friends at the oyster farm. Picnicking is an historical and important part of our farm visiting public’s visitor experience and recreation.”

Ixvii. DBOC 2010r, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, 2010, regarding interpretive services.

“Our comprehensive tours of Drakes Bay Oyster Company include the historical, cultural and ecological aspects of oyster farming in Drakes Estero. We also regularly include the broader subjects of sustainable agriculture, organic production and the history of other generational Seashore food producers in PRNS, including the dairy and beef ranches.”

Ixviii. DBOC 2011i, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on December 9, 2011 regarding Drakes Bay Oyster Company’s comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit.

“DBOC plays an essential role in educating the public on the history of oyster farming in PRNS, oysters’ values as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic sustainable farming.”

Ixix. Tomales Bay Oyster Company 2011, Letter from the Tomales Bay Oyster Company, LCC to Point Reyes National Seashore on December 7 regarding Tomales Bay Oyster Company, LCC comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit.

“We have expanded our operations in Tomales Bay to capacity. Although we maximize our production levels, the demand for oysters is too high for Tomales Bay growers to meet. We, therefore, cannot possibly make up any of the supply lost if Drakes Bay Oyster Company (DBOC) is closed. Because we cannot produce enough in Tomales Bay, our businesses currently purchase oysters from growers out of our region. Closing DBOC will cause a loss of local shellfish production that cannot be replaced. This is not speculation. The EIS failed to consult with local experts and have made incorrect assertions. The EIS must properly analyze the loss of the local shellfish production and the impacts to the local economy.

The Tomales Bay Oyster Company retail and picnic areas are at capacity and cannot expand. We already struggle with parking issues and traffic congestion. There is a clear lack of overflow picnic areas public or private to accommodate visitors to the oyster farm. DBOC customer base of 50,000-plus people will also lose the opportunity to be educated about the sustainable food production that farmed shellfish represents.”

Ixx. Hog Island Oyster Company 2011, Letter from the Hog Island Oyster Company to Point Reyes National Seashore on December 9 regarding Hog Island Oyster Company comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit.

“The production in Drake’s Estero is equal to or greater than all the production in Tomales Bay; the growers in Tomales Bay are all operating at or near capacity on our existing leases, and new lease areas very limited.”

We have hoped to expand our operation in Tomales Bay, but due to the onerous and expensive permit process, have found that nearly impossible. Shellfish farmers are highly regulated. Establishing a new shellfish farm involves obtaining permits and approvals at the local, state and

federal levels. Estimates for permits and environmental consulting for a new lease in Tomales Bay (which are capped at 5 acres) are well in excess of \$100,000, and could easily take over 3 years to complete. The current difficulty of obtaining permits will only increase up and down the entire West Coast, as the erroneous conclusions reached in the DEIS have the potential to migrate into the decision making processes of other agencies.

Shellfish companies of all sizes provide local jobs that are particularly important to rural communities. Our company currently employs over 25 people at our Tomales Bay facility and another 80 in the San Francisco Bay area. As much as we would like to we would not be able to absorb any of the laid off workers from DBOC. Those jobs would be lost to the West Marin community.

Our company, Tomales Bay Oyster Company and Drakes Bay Oyster Company all provide an important visitor serving function. People have the opportunity to visit a shellfish farm, learn about sustainable aquaculture, and purchase products that are healthy and produced in an environmentally sustainable manor (don't ask me – try Seafood Watch, Fish Wise or Food and Water Watch Smart Seafood). Our sites on Tomales Bay are near capacity. We cannot accommodate the 50,000+ annual visitors that would come to us if DBOC was shut down.”

Ixxi. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

“Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following.”

Ixxii. DBOC 2012b, Letter (with attachments) from Drakes Bay Oyster Company to Superintendent, Point Reyes National Seashore on June 5, regarding DBOC responses to the National Park Service's April 2012 questions.

“Moving forward, DBOC plans to make repairs to approximately 50 racks during 2013, 25 racks during 2014 and regular maintenance to all racks each year following.”

Ixxiii. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, regarding alternate building design. DBOC provided the Drakes Estero Aquaculture Center Concept Design v.1.0, dated April 29, 2009, prepared by Eco Design Collaborative (EDC).

Ixxiv. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, regarding alternate building design. DBOC provided the Drakes Estero Aquaculture Center Concept Design v.1.0, dated April 29, 2009, prepared by Eco Design Collaborative (EDC).

Ixxv. DBOC 2011g, Letter (with attachments) from Drakes Bay Oyster Company to Point Reyes National Seashore on March 5, regarding alternate building design.

“The EDC design would also improve the visitor experience and interpretive opportunities by allowing the public to view every step of the shellfish process, from seed production to shucking and packing.”

Ixxvi. DBOC 2010j, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding employee list. Provided a list of current staff (as of the date of the letter).

Ixxvii. DBOC 2010j, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding employee list. Provided a list of current staff (as of the date of the letter).

Ixxviii. DBOC 2010j, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding employee list. DBOC provided a list of current staff, including the home address of each (as of the date of the letter).

Ixxix. DBOC 2010k, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore on November 15, regarding housing.

“DBOC provides five homes with a total of 14 bedrooms for its employees; and in some cases, their families.”

Ixxx. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

“DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.”

During EIS preparation, DBOC did not provide documentation to support this visitation estimate.

Ixxxi. DBOC 2010n, Letter from Drakes Bay Oyster Company to Point Reyes National Seashore Superintendent on November 24, regarding Drakes Bay Oyster Company comments on National Park Service scoping letter for Special Use Permit Environmental Impact Statement.

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“The concept drawings do not show any worker housing except a manager’s residence. Worker housing may be incorporated into the design in the future.”

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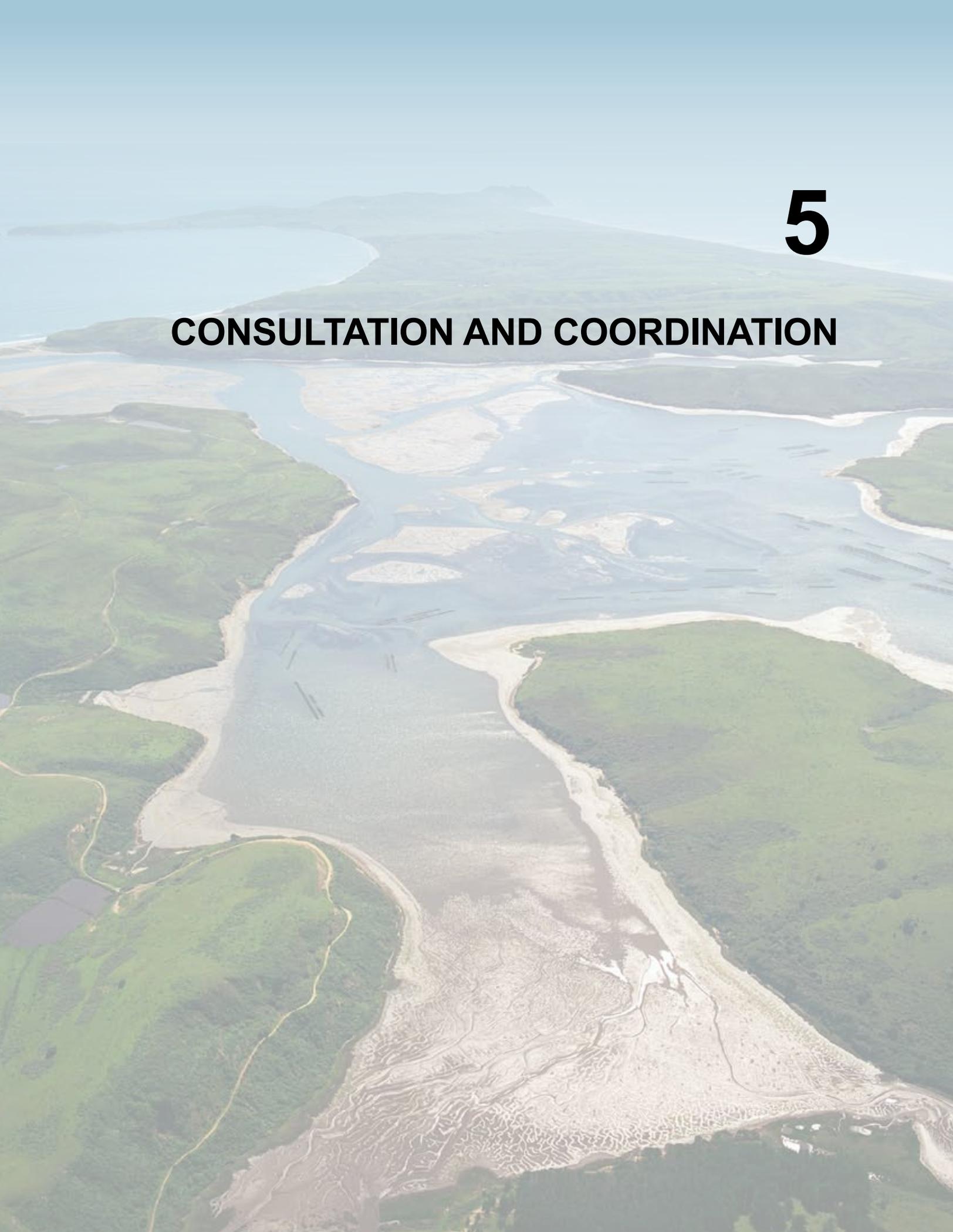
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An aerial photograph of a coastal landscape. In the foreground, a wide, braided river delta flows from the bottom center towards the middle of the frame. The river channels are light brown, contrasting with the surrounding green hills and fields. To the right, a large, flat, green area, possibly a wetland or marsh, is visible. In the background, a blue sea meets a hazy, distant coastline under a clear sky. The overall scene is a mix of natural water features and land use.

5

CONSULTATION AND COORDINATION

5

CONSULTATION AND COORDINATION

INTRODUCTION

This “Consultation and Coordination” chapter describes the public involvement and agency consultation used during the preparation of the EIS. A combination of activities, including public scoping, formal public meetings, internal workshops, and agency briefings, has helped to guide the NPS in developing this EIS. This chapter provides a detailed list of the various consultations initiated during the development of the EIS, as well as a list of preparers and the list of recipients for this document.

THE SCOPING PROCESS

The NPS divides the scoping process into two parts: internal scoping and external (public) scoping. Internal scoping involved discussions among NPS personnel regarding the purpose of and need for action, issues, available references and guidance, and other related topics. Public scoping is the early involvement of the interested and affected public in the environmental analysis process. The public scoping process helps ensure that the public has been given an opportunity to comment and contribute early in the decision-making process. For this EIS, project information was distributed to individuals, agencies, and organizations early in the scoping process, and people were given opportunities to express their views and identify important issues and alternatives or alternative elements. Internal and public scoping are essential elements of the NEPA planning process. The following sections provide information regarding the scoping activities that were conducted for this project.

INTERNAL SCOPING

An internal scoping meeting was held in September 2010 to initiate the EIS process. Attendees included staff members from the Seashore, DOI Solicitor’s Office, NPS Pacific West Region, NPS EQD, and contractor personnel. During the meeting, the group developed the draft purpose of and need for action, issues, and potential impact topics. This group met again in January 2011 and considered all public comments in the refinement of purpose, need, objectives, issues, and impact topics. Alternatives also were developed, taking comments received during public scoping into account.

PUBLIC SCOPING AND OUTREACH

The NPS issued a press release on September 22, 2010, to announce the public process for the project. A second press release was issued on October 5, 2010, to announce the dates, times, and places of the public scoping meetings. This initiated the project and the beginning of the public scoping and outreach process. On October 8, 2010, the NPS sent out letters to interested parties to inform them of the upcoming public scoping opportunities and activated the project on the PEPC web-site (<http://parkplanning.nps.gov/pore>). On October 22, 2010, the NOI to prepare the EIS was published in the Federal Register (NPS 2010d).

The NPS conducted three public open-house meetings. These meetings were held in the following locations on the following dates:

- October 26, 2010: Dance Palace Community Center, Point Reyes Station, California
- October 27, 2010: Bay Model Visitor Center, Sausalito, California
- October 28, 2010: REI Berkeley, Berkeley, California

A total of 343 people attended the three meetings (206 people attended the meeting at Point Reyes Station, 73 attended the meeting in Sausalito, and 64 attended the meeting in Berkley). Some people attended more than one meeting. At each of these meetings, the NPS provided handouts containing additional information about the NEPA process and commonly asked questions, and identified additional opportunities for the public to comment on the project, including by submitting comments on the NPS PEPC web-site. This information was further displayed on boards around each meeting venue. Seashore staff were available to answer questions and provide additional information to open-house participants. At least one Spanish language interpreter was present at each meeting. Public scoping meeting handouts and posters were made available on the PEPC and park web-sites.

Attendees were encouraged to provide comments both verbally and in writing. Flip charts were set up at each venue along with the informational boards. Verbal comments were captured in writing on these flip charts. Writing stations were also provided at each meeting where attendees could sit, write down their comments on official comment forms, and submit the forms into a box provided. Attendees also were welcome to submit any written comments they had brought with them to the meeting.

The public comment period for initial scoping extended for a total of 50 days (October 8, 2010, through November 26, 2010). The original scoping period was scheduled to end on November 22, 2010; however, due to an unexpected 1-day power outage affecting the NPS PEPC system, the comment period deadline was extended to November 26, 2010, to ensure that the public was provided with ample opportunity to submit their comments. Upon the conclusion of the public comment period, all comments received at or following the meeting were entered into PEPC, including the comments recorded on the flip charts during the meetings. These comments have been included in a public comment analysis report (NPS 2011c), which was used to inform the alternatives development process. The public comment analysis report, along with all comments received, was posted for public review on the park web-site at http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_scoping_comments.htm. Over 4,000 pieces of correspondence were received during the public scoping period for the EIS, and over 8,000 comments were derived from the correspondence received.

COOPERATING AGENCIES

In accordance with NEPA (42 U.S.C. 4321-4370h) and the CEQ regulations sections 1501.5 and 1501.6, NPS invited CCC, CDFG, EPA, NMFS, San Francisco Bay Regional Water Quality Control Board, USACE, MMC, and USFWS to be cooperating agencies for the EIS process. These agencies were requested to provide information in its areas of technical expertise and had the opportunity to comment on the internal review draft EIS provided in June 2011 (see appendix D for relevant correspondence, which is summarized below).

Four agencies replied that they would participate as cooperating agencies with the NPS in the development of the EIS. A cooperating agency agreement was executed between the NPS and CDFG, NMFS, USACE, and EPA to define the roles and responsibilities of the agencies. The San Francisco Bay Regional Water Quality Control Board, MMC, and the CCC declined the invitation to participate as cooperating agencies, and the USFWS did not respond. Details on establishment of these relationships are provided below.

In a letter dated October 14, 2010, NPS invited CDFG to become a cooperating agency during the preparation of the EIS. CDFG replied via email on November 1, 2010, expressing interest in reviewing the EIS as a cooperating agency.

The NPS invited USACE, San Francisco District, to become a cooperating agency during the preparation of the EIS in a letter dated October 14, 2010. USACE accepted this offer in a letter dated November 16, 2010 and stated that DBOC has no current USACE permits or applications. Further, the letter summarized USACE jurisdiction within the project area, including what permits may be applicable.

In a letter dated October 14, 2010, NPS invited EPA to serve as a cooperating agency during the preparation of the EIS. EPA responded in a letter dated November 23, 2010, accepting the invitation. EPA also stated that it plans to review the EIS pursuant to its review authority under section 309 of the Clean Air Act.

The NPS invited NMFS to serve as a cooperating agency during the preparation of the EIS in a letter dated October 14, 2010. A NMFS representative from the regional office contacted the NPS and asked about the cooperating agency letter. The letter was re-sent on November 17, 2010, via email, for review. The NMFS representative indicated to the NPS by phone on November 18, 2010, that it would participate as a cooperating agency.

In a letter dated October 14, 2010, NPS invited the San Francisco Bay Regional Water Quality Control Board to become a cooperating agency during the preparation of the EIS. The agency replied in an email dated November 10, 2010, that it did not plan on participating as a cooperating agency due to limited available staff resources.

The NPS invited CCC to become a cooperating agency during the preparation of the EIS in a letter dated October 14, 2010. CCC declined the invitation to participate as a cooperating agency in the development of the EIS in a letter dated November 9, 2010, but offered to make themselves available to answer specific questions and clarify relevant matters as needed.

In a letter dated October 14, 2011, NPS invited the USFWS to become a cooperating agency during the preparation of the EIS. No response was received from USFWS regarding cooperating agency status.

The NPS invited MMC to become a cooperating agency during the preparation of the EIS in a letter dated June 2, 2011. In an email dated August 24, 2011, MMC declined the invitation to participate as a cooperating agency given its ongoing role in reviewing the potential effects of oyster operations on harbor seals in Drakes Estero.

Each of the cooperating agencies was provided a copy of the Draft EIS. Copies were also sent to all agencies identified in the agency consultation section below. Agency consultation completed to date is included in appendix D.

AGENCY CONSULTATION

In addition to establishing which agencies would serve as cooperating agencies, as described above, other agencies were consulted to aid in identification of potential issues to be addressed in the EIS. Agency consultation is ongoing. Agency consultations are summarized below, and copies of relevant correspondence (including comments on the Draft EIS) are included in appendix D.

ESA SECTION 7 CONSULTATION

NPS initiated informal consultation (via the USFWS web-site) on November 17, 2010 with the USFWS about the presence of federally listed rare, threatened, or endangered species in the vicinity of the Seashore. USFWS replied in a letter dated November 17, 2010, providing a list of sensitive species that have been found in the USGS 7.5 minute quadrangle in which Drakes Estero lies. This list includes all listed species managed by USFWS and NMFS.

NMFS shares jurisdiction over marine threatened and endangered species with the USFWS. NPS requested scoping comments from NMFS in a letter dated October 8, 2010. The NMFS Southwest Regional Office provided formal comments in a letter dated November 22, 2010. This letter did not identify any federally threatened or endangered marine species protected under the ESA; however, NMFS comments on other applicable statutes are summarized in the following sections.

MAGNUSON-STEVENSON ACT CONSULTATION

In addition to managing federally threatened and endangered species, NMFS is responsible for managing essential fish habitat under the Magnuson-Stevens Act. As mentioned above, NPS requested scoping comments from NMFS in a letter dated October 8, 2010. The NMFS Southwest Regional Office provided formal comments on the project in a letter dated November 22, 2010, including a list of the relevant fishery management plans located in Drakes Estero. Identified fishery management plans include the Pacific Groundfish, the Pacific salmon, and the coastal pelagic. These plans identify relevant essential fish habitat. Consultation with NMFS related to essential fish habitat is ongoing.

MARINE MAMMAL PROTECTION ACT CONSULTATION

NMFS exerts jurisdiction over marine mammal species protected by the MMPA. As mentioned above, NPS requested scoping comments from NMFS in a letter dated October 8, 2010. The NMFS Southwest Regional Office provided formal comments on the project in a letter dated November 22, 2010, including the suggestion that the EIS consider the potential impacts of issuing a SUP to DBOC on marine mammals, including harbor seals, which are protected under the MMPA. Formal consultation with NMFS related to marine mammals is ongoing.

COASTAL ZONE MANAGEMENT ACT CONSISTENCY

CCC, an independent state agency, is responsible for the planning and review of activities within the coastal zone that may affect water quality, shorelines, terrestrial and marine habitats, etc., through specific policies outlined in the California Coastal Act. As such, CCC requested the approval of NOAA's Office of Ocean and Coastal Resource Management (OCRM) to review DBOC's proposal under section 307 of the CZMA and NOAA's implementing regulations at 15 CFR 903.54. On November 10, 2010, CCC requested permission from OCRM to review the proposal as an "unlisted activity" because a SUP for aquaculture operations is not listed as a federal license or permit activity requiring consistency review in the California Coastal Management Program. In its request, CCC illustrated that issuance of a SUP by NPS would have reasonably foreseeable effects on both coastal resources and uses of the California coastal zone.

In a letter dated March 30, 2011, OCRM granted approval to CCC to review the SUP for federal consistency with the federally approved California Coastal Management Program. The approval was based on an assessment that if the activity was permitted, it "would have a reasonably foreseeable effect on coastal uses or resources of the California coastal zone" (NOAA-OCRM 2011). Thus, prior to any NPS issuance of a SUP, DBOC must prepare and submit data and documentation that certifies all of its activities will be consistent with the enforceable policies of the California Coastal Management Program. Furthermore, CCC must either concur with the consistency certification or the certification must be presumed based on 15 CFR 930.54(e) before NPS may issue the SUP. CZMA consultation is ongoing between the NPS and CCC.

NHPA SECTION 106 CONSULTATION

Concurrent with this NEPA process, a section 106 review is being conducted to determine whether the actions proposed in this EIS would result in an adverse impact on historic properties. For the purposes of section 106, NPS has determined that the area of potential effect is the same as the EIS project area. Resources identified within the project area include a known archaeological site and a portion of the Point Reyes Ranches Historic District. The shellfish operation was found not eligible for the National Register.

The assessment of effect for all alternatives would be either no historic resources affected, or in the case of cultural landscapes, no adverse effect. The California SHPO has been consulted regarding the eligibility of DBOC facilities for listing on the National Register. On April 1, 2011, the NPS notified the SHPO that it intends to use this EIS process to meet section 106 consultation requirements. On

April 18, 2011, a letter was received from the Advisory Council on Historic Preservation acknowledging the NPS intent to use the EIS process to comply with section 106.

SHPO Consultation

On April 5, 2011, NPS provided SHPO with a copy of the DOE (Caywood and Hagen 2011) conducted for the DBOC site, with a letter requesting concurrence with the finding that the property is ineligible for listing on the National Register. Based on verbal comments from SHPO, the DOE was revised and resubmitted with a request for concurrence on July 8, 2011. SHPO responded in a letter dated August 4, 2011, noting its concurrence with the finding of ineligibility for listing on the National Register (SHPO 2011, see appendix D). Additionally, in a letter dated October 29, 2012, SHPO concurred with a finding of no adverse effects for all of the alternatives, although it was noted that unanticipated discovery or change in project description may require additional consultation under 36 CFR part 800 (SHPO 2012, see appendix D).

Advisory Council Consultation

On October 18, 2012, the Advisory Council confirmed that they had reviewed the documentation provided and that their involvement in the section 106 review was no longer necessary (ACHP 2012, see appendix D).

Tribal Consultation

The Seashore maintains a government-to-government relationship with The Federated Indians of Graton Rancheria. The NPS invited the Tribe to provide information on any features in the Seashore that may hold cultural or religious significance and, if such features exist, to initiate consultation on the EIS under NEPA and section 106 of the NHPA. During a meeting with a representative from The Federated Indians of Graton Rancheria on July 14, 2011, the NPS notified the Tribe that it planned to use this EIS process to meet section 106 consultation requirements. This was followed up by letter on August 10, 2011 (NPS 2011g). The Tribe responded in a letter dated August 29, 2011, noting their concurrence with the “request to use the EIS process to meet Section 106 ‘government to government’ consultation requirements” (FIGR 2011). Subsequently, on January 9, 2012, the NPS submitted a letter to The Federated Indians of Graton Rancheria to coordinate ongoing consultation and arrange a meeting to discuss the next steps for the proposed action, as related to section 106 consultation. Consultation with the Tribe was concluded on August 13, 2012, when The Federated Indians of Graton Rancheria submitted a letter of concurrence to NPS stating, “each of the four alternatives presented in the DEIS will have ‘no adverse effect’ on cultural resources under the standards set forth in 36 CFR 800.8(c)(1).” See appendix D for copies of this letter.

In addition to the section 106 consultation, The Federated Indians of Graton Rancheria/Coast Miwok were provided with a copy of the Draft EIS, but did not submit comments to the NPS. However, the Native American Heritage Commission (NAHC) commented on the Draft EIS on October 18, 2011.

CLEAN WATER ACT AND RIVERS AND HARBORS ACT

On November 16, 2010, USACE stated that, “aquaculture activities are within our jurisdiction and a permit is required” (USACE 2010, see relevant correspondence in appendix D). In addition to their participation in the project as a cooperating agency, USACE submitted formal comments on the Draft EIS related to compliance with section 404 and 401 of the Clean Water Act and section 10 of the Rivers and Harbors Act. In a letter dated December 8, 2011, USACE clarified the applicability of section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act and recommended additional information related to these acts be included in relevant sections of the “Laws and Policies” discussions in chapter 4 of the EIS (see appendix D). In this letter, USACE also reiterated the need for DBOC to obtain a permit for impacts on waters of the U.S., including wetlands, vegetated shallows, and open waters of the U.S. pursuant to section 10 of the Rivers and Harbors Act and/or section 404 of the Clean Water Act (USACE 2011a, see relevant correspondence in appendix D). The Rivers and Harbors Act also requires section 401 certification from the state (as issued by the San Francisco Bay Regional Water Quality Control Board). It would be the responsibility of DBOC to obtain all relevant permits and certifications.

U.S. ENVIRONMENTAL PROTECTION AGENCY

In accordance with the National Environmental Policy Act and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency reviewed the Draft EIS. In its response letter dated December 7, 2011, the agency rated the Draft EIS as Lack of Objections (LO).

STATE CLEARINGHOUSE

The NPS provided a copy of the NOI for the EIS to the state clearinghouse on October 26, 2010. The Seashore was copied on the clearinghouse review reminder to state agencies on November 17, 2010 (SCH #2010104004). The state clearinghouse comment period closed November 24, 2010. No comments were received through this announcement. In addition, the NPS provided a copy of the Draft EIS to the state clearinghouse on September 29, 2011. The state clearinghouse comment period for the Draft EIS closed on November 29, 2011. One piece of correspondence was received through the state clearinghouse (from the National American Heritage Commission). This correspondence was entered into PEPC and coded and considered with all other Draft EIS comments.

DOCUMENT REVIEW

The original public comment period was initiated on September 23, 2011 through a press release; announcements on the NPS PEPC web-site (www.parkplanning.gov/PORE) and the Seashore’s website (www.nps.gov/pore); and through a letter sent to interested parties, elected officials, and appropriate local and state agencies. Subsequently, the NPS notice of availability of the Draft EIS was published in the Federal Register on September 26, 2011. Following the announcement of the document’s availability and the distribution of the Draft EIS to agencies and the public, the Draft EIS was available for a review period from September 23, 2011 through November 29, 2011. The document was made available for review electronically on the NPS PEPC web-site (www.parkplanning.gov/PORE) and in hard copy at public

meetings and in local libraries. Hard copies or CDs also could be obtained by contacting the Seashore Superintendent. The public comment period was subsequently extended to December 9, 2011 in anticipation of the November 22, 2011 release of the final Marine Mammal Commission report on the impact of mariculture activities on harbor seals in Drakes Estero. The extension of the comment period was announced in a press release on November 17, 2011 and published by the EPA in the Federal Register on November 25, 2011. Three public meetings for the Draft EIS were held October 18-20, 2011 to continue the public involvement process and facilitate community feedback on the Draft EIS. Meeting times and locations for the three public meetings were as follows:

- Tuesday, October 18, 6:00-8:00 pm – Dance Palace Community Center, 503 B Street, Point Reyes Station, CA 94956
- Wednesday, October 19, 6:00-8:00 pm – Fort Mason Center, Building D, San Francisco, CA 94123
- Thursday, October 20, 6:00-8:00 pm – Tamalpais High School Student Center, 700 Miller Avenue, Mill Valley, CA 94941

During the 2011 open houses, several informational posters were displayed to supply information relevant to the project including the purpose, need, and objectives; existing conditions; alternatives evaluated in the Draft EIS; alternatives considered but dismissed; impact topics considered in the Draft EIS; and how to provide comments on the document. Attendees also were provided with a fact sheet (available in both English and Spanish), which provided additional background on the project, the current status of the project, the EIS schedule, and information on how to participate in the EIS process, including how to get a copy of the Draft EIS and how to submit comments. NPS included Spanish-language interpreters at all public meetings to accommodate parties of limited English. A total of 247 meeting attendees signed in during the open houses. Some individuals attended more than one open house and are counted more than once in this total. Attendees were able to provide oral statements to planning team members stationed at flip charts throughout the room. Team members wrote each comment on flip charts, which were posted on the wall for attendees to see and entered into PEPC upon completion of the open houses. All flip charts from each night were added as a single correspondence into PEPC. Written comments were also accepted at the open houses and entered into PEPC.

During the comment period, a total of 52,473 pieces of correspondence were received. Correspondence was received by one of the following methods: hard copy letter via mail, public comment sheet submitted at the public meetings, recorded on flipcharts during the public meetings, received in person at the Seashore headquarters, or entered directly into the PEPC system. As stated in the Draft EIS notice of availability posted in the Federal Register, bulk comments submitted on behalf of others were not accepted. Letters received by postal mail or in person, as well as the comments received from the public meetings, were entered into the PEPC system for analysis. Each of these letters or submissions is referred to as correspondence. It should be noted that the correspondence received included several form letters. In total, 24 distinct form letters were received. The number of copies of each ranged from only a few to 15,870. Overall, 50,040 of the pieces of correspondence received during the Draft EIS comment period were form letters. It should be noted that some pieces of correspondence included form letter text as well as additional language/comments that required further review and consideration. These letters were counted as unique correspondence, even though the letters included the form letter text.

Once all the correspondence was entered into PEPC, each was read, and specific comments within each correspondence were identified. When identifying comments, every attempt was made to capture the full breadth of the comments submitted. All comments received were carefully considered and incorporated into this Final EIS. Changes made in the Final EIS as a result of public comments did not result in substantial changes to the alternatives or the outcome of the impact analysis. All public comments received, and associated NPS responses, are included in the *DEIS Public Comment Analysis Report* in appendix F.

LIST OF RECIPIENTS

Copies of the Draft EIS (either hard copy or CD version) were made available to the following government officials and agencies, and nongovernmental organizations and agencies. Copies were also provided to individuals upon request. The names of individuals are not included below.

California Congressional Delegation

Senator Dianne Feinstein
Senator Barbara Boxer
Congresswoman Lynn Woolsey

Federal Agencies

Advisory Council on Historic Preservation
Marine Mammal Commission
National Oceanic and Atmospheric Administration – National Marine Fisheries Service
National Trust for Historic Preservation
U.S. Army Corps of Engineers, San Francisco District
U.S. Coast Guard
U.S. Coast Guard, Maintenance & Logistics (SE)
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
U.S. Geological Survey, Water Resources Division

Tribal Nations

The Federated Indians of Graton Rancheria/Coast Miwok

State Legislative Delegation

Senator Mark Leno
Assembly member Jared Huffman

State Agencies

California Coastal Commission
California Department Health Services
California Department of Fish and Game
California Department of Transportation
California State Coastal Conservancy
California State Parks and Recreation
California State Parks, Marin District
California State Historic Preservation Officer
California State Water Resources Control Board (San Francisco Bay Region)
State Clearinghouse – Office of Planning & Research
State Lands Commission

Local Governments

Bay Area Air Quality Management District
Bollinas Community Public Utility District
Inverness Public Utilities District
Marin County Agricultural Commissioner
Marin County Board of Supervisors
Marin County Community Development Agency
Marin County Farm Bureau
Marin County Fire Department
Marin County Library
Marin County Open Space District
Marin County Planning and Acquisition
Marin County Resource Conservation Service
Marin County Sheriff's Department
Marin Municipal Water District
North Marin Water District
San Francisco Main Library
Sonoma County Agricultural Preservation and Open Space District
Stinson Beach Library
West Marin Chamber of Commerce

Businesses, Nonprofits/Organizations, and Universities

4Cs Breeding Technologies, Inc.
Alliance for Local Sustainable Agriculture
Alta Planning & Design
Animal Protection Institute
Arizona Wilderness Coalition
Audubon California

Audubon Canyon Ranch
“B” Ranch
Bay Area Ridge Trail Council
The Bay Institute
Bicycle Trails Council
Bilington Sea Kayak
Bluewater Network
Bodega Marine Lab
Bollinas Community Land Trust
Bollinas Library
California Farm Bureau Federation
Californians for Western Wilderness (CalUWild)
Center for Biological Diversity
Coalition of National Park Service Retirees
The Committee for the Preservation of Tule Elk
Committee to Save the Future of Aqua/Agriculture in Rural Marin
Cypress Grove Preserve
The Dangermond Group
Defenders of Wildlife
Discovery Bay Shellfish
Drakes Bay Oyster Company
Earthjustice
East Shore Planning Group
Ebbin, Moser, & Skaggs LLP
Environmental Action Committee of West Marin
Environmental Defense Center
Ferrando’s Hideaway Cottages
Friends of the Estero
Full Belly Farm
Gardener’s Guild, Inc.
Great Old Broads for Wilderness
Humboldt Baykeepers
In Defense of Animals
International Mountain Bicycling Association
Inverness Association
Inverness Library
Inverness Ridge Association
K & B Seafood, Inc.
La Tercera Farm
Latham & Watkins LLP
LSA Associates, Inc.
Marin Agricultural Land Trust
Marin Audubon Society
Marin Bicycle Coalition
Marin Conservation League
Marin County Farm Bureau

Marin Horse Council
The Marine Mammal Center
Montana State University
Mow & Sow
National Fisheries Institute
National Parks Conservation Association
National Wildlife Foundation
Natural Resource Defense Council
Nature Conservancy
Nick's Cove & Cottages
North American Trail Ride Conference
Northwestern University
Ocean Conservancy
Ocean Conservation Research
Pacific Coast Shellfish Growers Association
People for a Golden Gate National Recreation Area
Point Reyes Bird Observatory
Point Reyes Library
Point Reyes Light
Public Employees for Environmental Responsibility
Resource Renewal Institute
Roots of Change
San Francisco Bay Bird Observatory
Sierra Club
Slow Food USA
Sonoma County Conservation Action
Sonoma County Farm Bureau
Sonoma County Horse Council
Spaletta Dairy
Star Route Farms
Station House Café
Sustainable Conservation
Sustainable Mill Valley
The Wilderness Society
Tomales Bay Association
Tomales Bay Watershed Council
Trout Unlimited
The Trust for Public Lands
Turtle Island Restoration Network
University of California, Berkeley
University of California, Cooperative Extension, Marin County
University of California, Davis
University of South Alabama
Vedanta Society
West Marin Chamber of Commerce
West Marin Citizen

West Marin Community Radio
 Wild Wilderness
 WildEarth Guardians

EIS PREPARERS

The NPS prepared this EIS with assistance from a contractor in accordance with CEQ regulations (1506.5). The NPS provided constant guidance and direction to the contractor regarding the scope and content of the EIS. The NPS has independently reviewed all sections of the EIS prior to publication and is responsible for the content of the EIS.

TABLE 5-1. LIST OF PREPARERS

Name	Title	Education/Responsibility	Experience
Contractor Team			
Vanasse Hangen Brustlin, Inc. (VHB)			
Nancy Barker	Federal Program Manager	MS Botany (Ecology); BS Botany (Taxonomy) Responsible for project oversight, development of chapter 1, and review of shellfish operations	28 years
Tricia Wingard	NPS Program Manager	BS Biology (Honors) Responsible for project management, document review, and document production	12 years
Tracy Hamm	Environmental Planner	MEM Ecosystem Science and Management; BS Biology Responsible for development of chapter 2, wilderness, soundscapes, and document production	3 years
Doug DeBerry	Senior Environmental Scientist	PhD Marine Science; MA Biology; BA Environmental Sciences Responsible for review of shellfish operations, eelgrass, and wildlife	18 years
Chris Senfield	Wetland Scientist	BS Biology Responsible for review of shellfish operations, wildlife, and special-status species	8 years
Kim Threlfall	Senior Environmental Planner	BA Geology Responsible for visitor experience and recreation, socioeconomic resources, NPS operations, and document production	10 years
Rita Walsh	Senior Preservation Planner	MS Historic Preservation; BA Historic Preservation Responsible for cultural landscapes and historic structures	29 years

TABLE 5-1. LIST OF PREPARERS (CONTINUED)

Name	Title	Education/Responsibility	Experience
Contractor Team			
Vanasse Hangen Brustlin, Inc. (VHB)			
Carol Weed	Senior Archaeologist	MA Anthropology (Archeology); BA Anthropology Responsible for archeological resources	39 years
Tim Davis	Senior Environmental Scientist, Certified Wildlife Biologist	MS Forestry; BS Forest Management Responsible for coastal flood zones, wetlands, and water quality	26 years
Tom Wholley	Director of Air Quality and Noise Services	BS Civil Engineering Responsible for soundscapes	40 years
Quan Tat	Senior Transportation Engineer	BS Civil Engineering Responsible for air quality	13 years
Margaret Beavers	Environmental Scientist	MS Geology; BS Geology Responsible for GIS analysis, graphic preparation, and document production	16 years
Michelle Tugman	Environmental Planner	MS Landscape Architecture; BS Biology Responsible for document production, public comment analysis, maintenance of the decision file	13 years
Diane Ditzel	Environmental Planner/Scientist	BA Geography Responsible for public comment analysis	2 years
Cultural Resources Consulting Services (CRCS)			
Janene Caywood	Principal Investigator	MA Anthropology; BS Anthropology (high honors) Responsible for preparation of the DOE	30 years
Delia Hagen	Field Assistant/Editor	PhD History; MA American History; BA History Responsible for preparation of the DOE	15 years
Terra Firma Surveys, Inc.			
Chris Cole	President/Licensed Land Surveyor	Post-graduate School of Surveying and Photogrammetry; BS Natural Resource Management Responsible for topographic survey	31 years
NPS Interdisciplinary Team			
Melissa Stedeford	EQD, Environmental Protection Specialist	MS Environmental Science; BS Environmental Science EIS Project Manager	7 years with NPS
Cicely Muldoon	Point Reyes National Seashore, Superintendent	BS Zoology	26 years with NPS
Brannon Ketcham	Point Reyes National Seashore, Hydrologist	MEM Water Resource Management; BA Geology Park Coordinator for EIS; cooperating agency point of contact	13 years with NPS

TABLE 5-1. LIST OF PREPARERS (CONTINUED)

Name	Title	Education/Responsibility	Experience
NPS Interdisciplinary Team			
Melanie Gunn	Point Reyes National Seashore, Outreach Coordinator	MS Natural Resources and Environment; BS Biology Park outreach coordinator	3 years with NPS
Kevin McKay	Point Reyes National Seashore, Special Park Uses Coordinator	JD; BA Economics DBOC point of contact	12 years with NPS
Gordon White	Point Reyes National Seashore, Chief of Cultural Resources	MS Psychology; MA Architecture; BA Environmental Design	17 years with NPS
Other Reviewers			
NPS			
Name	Title		
Patrick Walsh	EQD, Branch Chief, Environmental Planning and Compliance		
Doug Wetmore	EQD, Environmental Protection Specialist		
Christine S. Lehnertz	Pacific West Region (PWR), Regional Director		
George Turnbull	PWR, Deputy Regional Director		
Stephanie Burkhart	PWR, Assistant Regional Director, Communications		
Ray Sauvajot	PWR, Natural Resource Manager		
Alan Schmierer	PWR, Regional Environmental Coordinator		
Martha Crusius	PWR, Senior Planner		
Kurt Frstrup	Natural Resources Stewardship and Science (NRSS), Bioacoustics Technician		
Department of the Interior, Solicitors Office			
Barbara Goodyear	Field Solicitor		
Suzanne Carlson	Assistant Field Solicitor		

TABLE 5-2. COOPERATING AGENCY POINTS OF CONTACT

Name	Agency
Bryan Matsumoto	USACE, Regulatory Division
Diane Windham	NMFS, Southwest Regional Aquaculture Coordinator
Kirsten Ramey	CDFG, Associate Marine Biologist
Stephanie Skophammer	EPA, Environmental Review Office, Communities and Ecosystems Division
Kevin Chu	NOAA, Deputy Regional Administrator, Southwest Region

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An aerial photograph of a river delta system, likely the Amazon, showing a complex network of channels and sandbars. The river flows from the top center towards the bottom, where it branches out into a wide, intricate delta. The surrounding landscape is a mix of green vegetation and light-colored, sandy or silty banks. In the upper left, a large body of water, possibly a bay or the ocean, is visible. The word "REFERENCES" is printed in bold, black, uppercase letters in the upper right quadrant of the image.

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GLOSSARY

A

abiotic. Characterized by the absence of life or living organisms.

abundance. An ecological concept referring to the relative representation of a species in a particular ecosystem. It is usually measured as the large number of individuals found per sample. How species abundances are distributed within an ecosystem is referred to as relative species abundances.

accretion. The process where coastal sediments return to the visible portion of the beach following storm erosion.

acidification. To make or become acidic.

action. Any federal activity including, but not limited to, acquiring, managing, and disposing of federal lands and facilities; facilitating human occupation or visitation; providing federally undertaken, financed, or assisted construction and improvements; and conducting federal activities and programs affecting land use, including, but not limited to, water and related land resources planning, and regulating and licensing activities.

action alternative. An alternative that proposes a different management action (or actions) to address the purpose, need, and objectives of the plan. Alternatives B, C, and D are the action alternatives in this EIS. See also: “no-action alternative.”

affected environment. A description of the existing environment that may be affected by the proposed action (40 CFR 1502.15).

aggrading substrate. A net accumulation of sediment on the basin floor over time.

algal blooms. A rapid increase in the population of algae in an aquatic system. Algal blooms may occur in freshwater, as well as marine environments. Typically, only one or a small number of phytoplankton species are involved, and some blooms may be recognized by discoloration of the water resulting from the high density of pigmented cells. Although there is no officially recognized threshold level, algae can be considered to be blooming at concentrations of hundreds to thousands of cells per milliliter, depending on the severity. Algal bloom concentrations may reach millions of cells per milliliter.

ambient. Of the surrounding area or environment.

amphibian. Any cold-blooded vertebrate of the class Amphibia, comprising frogs and toads, newts and salamanders, and caecilians, the larvae being typically aquatic, breathing by gills, and the adults being typically semiterrestrial, breathing by lungs and through the moist, glandular skin.

amphipods. Any of numerous small, flat-bodied crustaceans of the group Amphipoda, including the beach fleas, sand hoppers, etc.

anadromous. Fish migrating from salt water to spawn in fresh water.

anecdotal. Based on or consisting of reports or observations of usually unscientific observers.

anthropogenic. Resulting from the influence or actions of human beings.

appropriate use. NPS *Management Policies 2006* (NPS 2006d) state that an appropriate use is “a use that is suitable, proper, or fitting for a particular park, or to a particular location within a park.”

aquaculture. The cultivation of aquatic organisms (as fish or shellfish), especially for food. (Term used interchangeably in the EIS with mariculture or commercial shellfish operation.)

archeological resource. Any material remains or physical evidence of past human life or activities which are of archeological interest, including the record of the effects of human activities on the environment. An archeological resource is capable of revealing scientific or humanistic information through archeological research.

Area of Special Biological Significance. Areas designated by the State Water Resources Control Board as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are State Water Quality Protection Areas as defined in Public Resources Code section 36700(f).

arthropod. An invertebrate that has an exoskeleton (external skeleton), a segmented body, and jointed attachments called appendages.

B

basin morphometry. The shape and internal geometry of the catchment area of a particular river and its tributaries or of a lake or sea.

bathymetric gradient. Changes in light, temperature, salinity, and pressure with depth.

benthic. The bottom, or relating to the bottom of the ocean or other body of water.

benthic-pelagic coupling. The process in which filter feeders, such as bivalves, contribute to the cycling of nutrients and organic matter between the bottom substrate (benthic system) and the overlying water column (pelagic system). With respect to bivalves, the concept relates to the manner in which these filter feeders

remove particulate organic and inorganic matter (including plankton) from the water column and, through the process of digestion and excretion, “repackage” that material into other forms that are more readily available for uptake by other organisms inhabiting the bottom substrate.

bents. Structures that are anchored to the bottom substrate of Drakes Estero and provide the primary structural support for racks used for hanging culture methods, often 2-inch by 4-inch or 2-inch by 6-inch wooden boards.

best management practices. Practices that apply the most current means and technologies available to not only comply with mandatory environmental regulations, but also maintain a superior level of environmental performance.

biodiversity. An assessment of the numbers, types, and relative abundance of plant and animal species in natural (biotic) communities. Biodiversity encompasses species richness as well as the genetic differences among individuals, abundance, or variety of habitats, communities, ecosystems, and landscapes where species occur.

biogeochemical cycling. The chemical interactions that exist between biological organisms and the abiotic (nonliving) components of the environment such as air, water, and soil.

biological resources. NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) state that “[t]he National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.”

biota. The animals, plants, fungi, etc., of a region or period.

bivalve. A mollusc with a shell consisting of two rounded plates called *valves* joined at one edge by a flexible ligament called the *hinge*. The shell is typically bilaterally symmetrical, with the hinge lying in the sagittal plane.

bottom bags. Plastic mesh bags (often 3 feet by 4 feet in size) used in cultivation of single shellfish. Bags are placed directly on the sediment in intertidal areas.

brackish. Slightly salty.

breeding activity. Shorebird behavior that includes, but is not limited to, courtship, mating, scraping, confirmed scrapes, and other breeding or nest-building activities. The terms breeding behavior and breeding activity are used synonymously.

breeding areas/breeding sites. Those areas that support the full suite of bird breeding activities including, courtship, territorial defense, copulation, scraping and nest building, egg laying and incubation, chick rearing, and associated foraging.

breeding habitat. Habitat(s) that host the birds during territorial displaying, courtship and mating, scraping, nesting, incubation, brooding, and chick foraging.

brood stock. In aquaculture, a group of sexually mature individuals of a cultured species that is kept separate for breeding purposes.

buffer. A protective area or distance surrounding a sensitive resource that limits visitor access.

C

carbon footprint. A measure of the amount of carbon dioxide released into the atmosphere by a single endeavor or by a company, household, or individual through day-to-day activities over a given period.

Census Designated Place. Delineated for each 10-year census as the statistical counterparts of incorporated places. Census Designated Places are delineated to provide data for settled concentrations of population that are identifiable by name but are not legally incorporated under the laws of the state in which they are located. The boundaries usually are defined in cooperation with local or tribal officials. These boundaries, which usually coincide with visible features or the boundary of an adjacent incorporated place or other legal entity boundary, have no legal status, nor do these places have officials elected to serve traditional municipal functions. Census Designated Place boundaries may change from one 10-year census to the next with changes in the settlement pattern; a Census Designated Place with the same name as in an earlier census does not necessarily have the same boundary. There are no population size requirements for the Census Designated Places designated in conjunction with Census 2000. For the 1990 census and earlier censuses, the U.S. Census Bureau required Census Designated Places to qualify on the basis of various minimum population size criteria.

climate change. Any long-term significant change in the weather patterns of an area.

coastal lagoons. A lagoon is a body of shallow seawater or brackish water separated from the sea by some form of barrier. A coastal lagoon is formed by the build-up of sandbanks or reefs along shallow coastal waters. Lagoons that are fed by freshwater streams are also called estuaries.

coastal scrub vegetation. Terrestrial vegetation characterized by woody shrub species from 3 to 7 feet tall. Shrubs are defined as woody perennials with multiple stems growing from the base. Most California shrublands have abundant *xerophytes*, or species adapted to arid conditions. In coastal areas, shrubs often form low-growing stands mixed with grasses. Coastal scrub is usually located inland of foredunes, where decreased wind and salt spray allow better stabilization and increased plant height.

coastal waterbirds. Birds that forage along the interface between land and salt/freshwater.

Compendium. The Superintendent's Compendium is a document, updated yearly, that provides a list of the special designations, closures, public use limits, permit requirements, and other restrictions under the discretionary authority of the Superintendent within a park unit, as provided for in 36 CFR 1.7 (b).

congressionally designated potential wilderness. According to *NPS Management Policies 2006*, potential wilderness is defined as lands that do not qualify for immediate designation as wilderness "due to temporary nonconforming or incompatible conditions" (NPS 2006d). Section 4(c) of the Wilderness Act of 1964 (PL 88-577) identifies prohibited uses, otherwise known as nonconforming uses. See "congressionally designated wilderness" for the definition of wilderness.

congressionally designated wilderness. The Wilderness Act of 1964 (PL 88-577) created the National Wilderness Preservation System and recognized wilderness as "an area where the earth and its community

of life are untrammelled by man, where man himself is a visitor who does not remain.” The Act further defined wilderness as “an area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions” (for the complete definition of wilderness, see section 2[c] of the Wilderness Act). Wilderness is designated by Congress.

conserve. To protect from loss or harm; preserve. Historically, the terms conserve, protect, and preserve have come collectively to embody the fundamental purpose of the NPS—preserving, protecting, and conserving the national park system.

continental shelf. The part of a continent that is submerged in relatively shallow sea.

conveyed. To transfer or transmit (property or property rights) to another, especially in writing (as a deed or will).

cooperating agencies. A federal agency other than the one preparing the NEPA document (lead agency) that has jurisdiction over the proposal by virtue of law or special expertise and that has been deemed a cooperating agency by the lead agency.

Council on Environmental Quality (CEQ). Established by Congress within the Executive Office of the President with passage of the *National Environmental Policy Act of 1969*. CEQ coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Crassadoma gigantean. See “purple-hinged rock scallops.”

Crassostrea gigas. See “Pacific oysters.”

Crassostrea sikamea. See “Kumamoto oysters.”

crustaceans. Any of various widespread arthropods of the class Crustacea that live mostly in water and have a hard shell, a segmented body, and jointed appendages. Crustaceans include crabs, lobsters, shrimp, barnacles, and copepods.

cultch material. Oyster shells used to furnish points of attachment for the spat.

cultivation. An aquaculture (or mariculture) practice in which oysters are raised for human consumption.

cultural landscape. A geographic area (including both cultural and natural resources and the wildlife therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

cultural resource. An aspect of a cultural system that is valued by or significantly representative of culture, or that contains significant information about a culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places, and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for NPS management purposes.

cultured/cultivated. Artificially nurtured or grown.

cumulative impacts. Those impacts on the environment that result from the incremental effect of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

D

decapods. Invertebrate animals of the order Crustacea which have five pairs of legs and includes shrimp, lobsters, crabs, etc.

decibel (dB). A unit of measure of sound intensity.

decibel, A-weighted (dBA). A unit of measure of sound intensity as perceived by the human ear, where the values of sounds at low frequencies are reduced, compared with unweighted values, in which no correction is made for audio frequency.

de minimis. So small or minimal in difference that it does not matter or the law does not take it into consideration.

determination of eligibility (DOE). An evaluation to determine whether a property meets the National Register Criteria for Evaluation by examining the property's age, integrity, and significance.

detritus. A non-living particulate organic material (as opposed to dissolved organic material). It typically includes the bodies or fragments of dead organisms as well as fecal material. Detritus is typically colonized by communities of microorganisms which act to decompose (or remineralize) the material.

diatom. Any of numerous microscopic, unicellular, marine or freshwater algae of the phylum Chrysophyta, having cell walls containing silica. Most diatoms can perform photosynthesis. They make up a large portion of the marine plankton and are an important food source for many aquatic animals.

Didemnum vexillum. A species of highly invasive nonnative tunicate found in Drakes Estero.

dinoflagellate. Any of numerous one-celled organisms found mostly in the ocean, usually having two flagella of unequal length and often an armorlike covering of cellulose. Dinoflagellates are one of the main components of plankton. Since dinoflagellates have characteristics of both plants and animals, their classification is controversial.

Director's Order. A supplement to the NPS *Management Policies 2006* (NPS 2006d), which may amend the policies.

dredging. An excavation activity or operation usually carried out at least partly underwater, in shallow seas or fresh water areas, with the purpose of gathering up bottom sediments and disposing of them at a different location.

E

ecology. The interdisciplinary scientific study of the interactions between organisms and the interactions of these organisms with their environment.

ecosystem. A natural unit consisting of all plants, animals, and microorganisms (biotic factors) in an area functioning together with all of the physical (abiotic) factors of the environment, considered as a unit. Ecosystems can be permanent or temporary. An ecosystem is a unit of interdependent organisms which share the same habitat. Ecosystems usually form a number of food webs.

El Nino–Southern Oscillation. A warming of the surface water of the eastern and central Pacific Ocean, occurring every 4 to 12 years and causing unusual global weather patterns. An El Nino is said to occur when the trade winds that usually push warm surface water westward weaken, allowing the warm water to pool as far eastward as the western coast of South America. When this happens, the typical pattern of coastal upwelling that carries nutrients from the cold depths to the ocean surface is disrupted, and fish and plankton die off in large numbers. El Nino warming is associated with the atmospheric phenomenon known as the southern oscillation, and their combined effect brings heavy rain to western South America and drought to eastern Australia and Indonesia. El Nino also affects the weather in the United States, but not as predictably.

embayment. A bay or a shape resembling a bay.

emergent. An aquatic plant having its stems, leaves, etc., extending above the surface of the water.

enabling legislation. National Park Service legislation that established a particular unit of the national park system and set forth the legal parameters by which the respective park may operate.

endangered species. “...any species (including subspecies or qualifying distinct population segment) that is in danger of extinction throughout all or a significant portion of its range (ESA section 3[6]).” U.S. Fish and Wildlife Service is responsible for reviewing the status of the species on a five-year basis.

endobenthic. Marine organisms that burrow in the soft sediments of the sea bed.

environment. The sum total of all biological, chemical, and physical factors to which organisms are exposed; the surroundings of a plant or animal.

environmental assessment (EA). A concise public document, prepared in compliance with NEPA, that briefly discusses the purposes and need for an action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

environmental consequences. Environmental effects of project alternatives, including the proposed action, any adverse environmental effects which cannot be avoided, the relationship between short term uses of the human environment, and any irreversible or irretrievable commitments of resources which would be involved if the proposal should be implemented (40 CFR 1502.16).

environmental impact statement (EIS). A detailed written statement that analyzes the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short term uses of the environment versus the maintenance and enhancement of long term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).

environmental justice. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

environmentally preferable alternative. “The alternative that causes the least damage to the biological and physical environment; the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ 1981, Q6a).

ephemeral pools. Temporary pools of water. They are usually devoid of fish, and thus allow the safe development of natal amphibian and insect species.

epibenthic. Marine life that inhabits the soft sediments on the surface of the seafloor.

epiphyte. A plant that grows above the ground, supported nonparasitically by another plant or object, and deriving its nutrients and water from rain, the air, dust, etc.

erosion. Removal of surface material from the earth’s crust, primarily soil and rock debris, and the transportation of the eroded materials by natural agencies from the point of removal.

essential fish habitat. Habitat where fish spawn, breed, feed, or grow to maturity, designated by NMFS and regional fisheries management councils.

estero. A tidal body of water where salt water from an ocean mixes with fresh water from a river. See also “estuary”.

estuarine. Referring to the area of water passage where the tide meets a river current; especially an arm of the sea at the lower end of a river.

estuary. A tidal body of water where salt water from an ocean mixes with fresh water from a river. See also “estero.”

ethnographic resource. Any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

European flat oysters. Otherwise known as *Ostrea edulis*, European flat oysters are native to Europe and are permitted for cultivation in Lease M-438-01; however, the last record of this species being sold at the site is from April 1968.

Executive Order. Official proclamation issued by the President that may set forth policy or direction or establish specific duties for federal agencies in connection with the execution of federal laws and programs.

exotic species. Any introduced plant, animal, or protist species that is not native to the area and may be considered a nuisance; also called nonnative or alien species.

extirpate. To destroy the whole of; eliminate or eradicate.

F

fair market value. An estimate of the market value of a property, based on what a knowledgeable, willing, and unpressured buyer would most likely pay to a knowledgeable, willing, and unpressured seller in the market.

fault zone. Area of many closely-spaced faults.

fauna. All of the animal life of any particular region or time.

fecal coliform. A group of bacteria that lives in the intestines of warm-blooded animals. Elevated measurements of these bacteria in surface waters may indicate the presence of human and/or animal waste. Health advisories may be posted when measurements indicate an increased risk to human's from exposure.

Federal Register. A daily publication of the U.S. federal government that issues proposed and final administrative regulations of federal agencies.

feral. An organism that has escaped from domestication and returned, partly or wholly, to a wild state. Otherwise known as naturalized.

filamentous algae. Algae that form filaments or mats attached to sediment, weeds, piers, etc.

flat wake speed. Flat wake speed means the minimum required speed to leave a flat wave disturbance close astern a moving vessel yet maintain steerageway, but in no case in excess of 5 statute miles per hour (36 CFR 1.4).

floodplain. Any land area susceptible to inundation by floodwaters from any source.

flood zone. An area subject to the risk of flooding by any natural means, either by water cresting the banks of channels (fluvial floodplain) or by tidal surges and tsunamis.

flushing. To flood or spray thoroughly with water, as for cleansing purposes.

foredunes. A part of a system of sand dunes on the side nearest to the sea.

fossil fuel. Any combustible organic material, as oil, coal, or natural gas, derived from the remains of former life.

French tube culture. Oyster cultivation method in which oysters are grown directly on tubes, known as French tubes, which are roughly coated in concrete. The tubes are hung on racks and take approximately

12 months for oysters to reach market size. These hanging cultures are used for growth of clusters of oysters. These clusters generally require approximately three months in bags on intertidal areas for shell hardening prior to processing.

freshwater marsh. Grassy wetlands that occur along rivers and lakes; dominated by grasses, reeds, rushes, and sedges.

G

geologic resources. Features, landforms, and viewsheds of the Earth and its crust.

granted tideland. All of the tide and submerged lands or other lands beneath navigable waters situated within the boundaries of the Point Reyes National Seashore, granted by the state of California in 1965, subject to certain limitations, and owned in fee by the U.S.

greenhouse gas emissions. Discharge associated with the burning of fossil fuels. These emissions absorb infrared radiation (net heat energy) emitted from the Earth's surface and reradiate it back to the Earth's surface, thus contributing to the phenomenon known as the greenhouse effect.

H

habitat. The environment in which a plant or animal lives (includes vegetation, soil, water, and other factors).

habitat areas of particular concern. Subsets of essential fish habitat that are rare, particularly susceptible to human-induced habitat degradation, especially ecologically important, or located in an environmentally stressed area.

haul-out site. The location especially associated with pinnipeds (seals), of temporarily leaving the water between periods of foraging activity for sites on land or ice.

harbor seal protection area. Areas within Drakes Estero of which throughout the year, all boats, personnel, and any structures and materials are prohibited from entering in order to protect the harbor seals that frequent the site.

hatcheries. Where oysters are bred in captivity to produce larvae or spat.

headlands. A narrow area of land extending into a large body of water.

Hemispheric Importance. A designation assigned by Western Hemisphere Shorebird Reserve Network to indicate sites that have greater than 500,000 shorebirds annually.

herbaceous. Designating or relating to plants or plant parts that are fleshy as opposed to woody.

historic structures. A historic structure is defined by NPS DO-28 (NPS 2002b) as "a constructed work, usually immovable by nature or design, consciously created to serve some human act." To be listed on or eligible for listing on the National Register, a site, structure, object or district must possess historic

integrity of those features necessary to convey its significance, particularly with respect to location, setting, design, feeling, association, workmanship, and materials.

human disturbance. Any human activity that changes the coexisting behavior of one or more individuals during breeding, nesting, foraging, or roosting. Behaviors indicating disturbance include defensive displays; alarm calls; flushing or leaving a nest or feeding area; and diving or mobbing pedestrians, dogs, or vehicles.

hydric. Relating or adapted to a wet but not flooded habitat.

hydrocarbons. Compounds of hydrogen and carbon including methane and ethane. Gases that are generated by unburned and wasted fuel and come from incomplete combustion of fossil fuels and from evaporation of liquid fuels.

hydrology. The study of the movement, distribution, and quality of water throughout earth, and thus addresses both the hydrologic cycle and water resources.

hydrophytes. A plant that grows wholly or partly submerged in water.

I

impairment. As used in *NPS Management Policies 2006*, “impairment” means an adverse impact on one or more park resources or values that interferes with the integrity of the park’s resources or values, or the opportunities that otherwise would exist for the enjoyment of them, by the present or a future generation (NPS 2006d). Impairment may occur from visitor activities, NPS activities in managing a park, or activities undertaken by concessioners, contractors, and others operating in a park. As used here, the impairment of park resources and values has the same meaning as the phrase “derogation of the values and purposes for which these various areas have been established,” as used in the General Authorities Act.

Important Bird Area. Important Bird Areas (IBAs) are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands or both, and they may be protected or unprotected.

To qualify as an IBA, sites must satisfy at least one of the following criteria. The site must support

- species of conservation concern (e.g., threatened and endangered species);
- restricted-range species (species vulnerable because they are not widely distributed);
- species that are vulnerable because their populations are concentrated in one general habitat type or biome; or
- species or groups of similar species (such as waterfowl or shorebirds) that are vulnerable because they occur at high densities due to their congregatory behavior.

Indian Trust resources. The federal Indian Trust responsibility is a legally enforceable obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry

out the mandates of federal laws with respect to Native American tribes. Of the federally recognized tribes pursuant to PL 103-454, 108 Statute 4791, the Coastal Miwok, part of the Federal Indian Graton Rancheria, is the only tribe affiliated with the Seashore. However, there are no known Indian Trust resources in the study area, and the lands comprising the Seashore are not held in trust by the Secretary for the benefit of Indians.

indicator species. A species whose presence gauges the ecological health of the habitat.

internal scoping. Internal NPS decision-making on issues, alternatives, mitigation measures, the analysis boundary, appropriate level of documentation, lead and cooperating agency roles, available references and guidance, defining purpose and need, and so forth.

interpretive services. Methods such as educational programs, interpretive media, and partnerships that the NPS uses to connect people to their parks, with opportunities for all visitors to form their own intellectual, emotional, and physical connections to the meanings and values found in the park's stories.

intertidal. The area that is exposed to the air at low tide and underwater at high tide (i.e., the area between tide marks). This area can include many different types of habitats, including steep rocky cliffs, sandy beaches, or wetlands (e.g., vast mudflats).

intertidal zone. The area that is exposed to the air at low tide and underwater at high tide (for example, the area between tide marks). This area can include many different types of habitats, including steep rocky cliffs, sandy beaches, or wetlands (e.g., vast mudflats). The area can be a narrow strip, as in Pacific islands that have only a narrow tidal range, or can include many meters of shoreline where shallow beach slope interacts with high tidal excursion.

invasive species. Not native to and tending to spread widely in a habitat or environment. Invasive species often have few natural predators or other biological controls in their new environment. Although not always considered harmful to an environment, invasive species can become agricultural or ecological pests and can displace native species from their habitats. Invasive species are often introduced to an environment unintentionally but are sometimes introduced for a purpose.

invertebrates. An animal that has no backbone or spinal column. Corals, insects, worms, jellyfish, starfish, and snails are invertebrates.

irretrievable. A term that applies to the loss of production, harvest, and consumptive or nonconsumptive use of natural resources. For example, recreation experiences are lost irretrievably when an area is closed to human use. The loss is irretrievable, but the action is not irreversible. Reopening the area would allow a resumption of the experience.

irreversible. A term that describes the loss of future options. Applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.

isopods. Any of numerous mostly small crustaceans of the order Isopoda, characterized by a flattened body and a series of wide, armor-like plates covering the back.

J

Japanese hanging culture. Oyster cultivation method in which oysters are grown on recycled left valves (shells), and these shells are strung along wires through holes punched in the recycled shell. Clumps of approximately 14 shells are separated by approximately 6 inches of PVC piping to allow for cluster development. These wires are completely suspended and should not make contact with the bottom. From the time oysters are initially placed on the racks, they require approximately 16-18 months to reach market size, depending upon environmental conditions.

K

kelp. Any of various brown, often very large seaweeds that grow in colder ocean regions.

Kumamoto oysters. Otherwise known as *Crassostrea sikamea*, Kumamoto oysters are native to Japan and have not been permitted for cultivation within Drakes Estero since 1979. Remnant populations from historic cultivation are reported to have been removed.

L

La Niña. A cooling of the surface water of the eastern and central Pacific Ocean, occurring somewhat less frequently than El Niño events but causing similar, generally opposite disruptions to global weather patterns. La Niña conditions occur when the Pacific trade winds blow more strongly than usual, pushing the sun-warmed surface water farther west and increasing the upwelling of cold water in the eastern regions. Together with the atmospheric effects of the related southern oscillation, the cooler water brings drought to western South America and heavy rains to eastern Australia and Indonesia.

larvae. An animal in an early stage of development that differs greatly in appearance from its adult stage. Larvae are adapted to a different environment and way of life from those of adults and go through a process of metamorphosis in changing to adults.

light attenuation. The energy loss of a beam as it passes through a material.

lightscares. Natural ambient landscapes and other values that exist in the absence of man-made light (NPS 2006).

logarithmic scale. A scale of measurement that uses the logarithm of a physical quantity instead of the quantity itself.

low-income. CEQ Guidelines state that low income populations should be identified using the annual statistical poverty thresholds developed by the U.S. Census Bureau. Data for poverty from the 2006-2010 American Community Survey 5-Year Estimates, which are based on U.S. Census data, were used to identify low-income populations in this EIS.

M

macroalgal mats. “Blooms” of green marine algae that become encrusted on the sediment surface.

Manila Clams. Otherwise known as *Venerupis philippinarum*, Manila clams are native to the Philippines.

This species was added to Lease M-438-02 in 1993 by CFGC and was transferred to M-438-01 in 2009; however, the NPS SUP permits cultivation of this species in Lease M-438-02, not Lease M-438-01. See Chapter 1 for additional administrative history regarding cultivation of this species within the project area.

mariculture. The cultivation of marine plants and animals in their natural environment. (Term used interchangeably in the EIS with aquaculture or commercial shellfish operation.)

marine. Of or pertaining to the sea; existing in or produced by the sea.

Marine Protected Areas (MPAs). Term that encompasses a variety of conservation and management methods in the United States.

maritime. Of or relating to navigation or commerce on navigable waters.

marshbirds. Birds foraging primarily in freshwater.

mean high tide. The mean average of all the high tides (high high tides and low high tides) occurring over a certain period of time, usually 18.6 years (one lunar epoch).

microcultch. Oyster shells ground for use in single oyster culture on which juvenile oysters can grow.

microhabitats. The environment of a very small, specific area, distinguished from its immediate surroundings by such factors as the amount of incident light, the degree of moisture, and the range of temperatures. The side of a tree that is shaded from sunlight is a microenvironment that typically supports a somewhat different community of organisms than is found on the side that receives regular light.

microorganisms. An organism that can be seen only with the aid of a microscope and that typically consists of only a single cell.

mid zone. A zone within intertidal rocky shore habitats that is periodically exposed to air and harbors an abundance of organisms dwelling within the spaces between the rocks. Examples of organisms include mussels, limpets, crabs, anemones, chitons, black turban snails, and several species of algae.

molluscs. Any of numerous invertebrate animals of the phylum Mollusca, usually living in water and often having a hard outer shell. They have a muscular foot, a well-developed circulatory and nervous system, and often complex eyes. Molluscs include gastropods (snails and shellfish), slugs, octopuses, squids, and the extinct ammonites.

monocultures. The cultivation of a single crop on a farm or in a region or country.

monitoring. A process of collecting information to evaluate if an objective and/or anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if implementation is proceeding as planned (implementation monitoring).

morphometry. Measurement of the form of organisms or of their parts.

mudflats. Coastal wetlands that form when mud is deposited by tides or rivers. They are found in sheltered areas such as bays, bayous, lagoons, and estuaries. Mudflats may be viewed geologically as exposed layers of bay mud, resulting from deposition of estuarine silts, clays, and marine animal detritus. Most of the sediment within a mudflat is within the intertidal zone, and thus the flat is submerged and exposed approximately twice daily.

N

National Environmental Policy Act of 1969 (NEPA). The federal legislation that requires all federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and utilize public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements and prepare appropriate NEPA documents to facilitate better environmental decision making. NEPA requires federal agencies to review and comment on federal agency environmental plans/documents when the agency has jurisdiction by law or special expertise with respect to any environmental impacts involved (42 U.S.C. 4321-4327) (40 CFR 1500– 1508).

National Environmental Policy Act (NEPA) process. The objective analysis of a proposed action to determine the degree of its impact on the natural, physical, and human environment; alternatives and mitigation that reduce that impact; and the full and candid presentation of the analysis to, and involvement of, the interested and affected public—as required of federal agencies by the National Environmental Policy Act of 1969.

National Register of Historic Places (National Register). To be listed on or eligible for listing on the National Register, a site, structure, object or district must possess historic integrity of those features necessary to convey its significance, particularly with respect to location, setting, design, feeling, association, workmanship, and materials.

naturalized. An organism that has escaped from domestication and returned, partly or wholly, to a wild state. Otherwise known as feral.

nesting habitat. Habitat(s) that host the birds during nesting including incubation, brooding and chick foraging.

no-action alternative. An alternative that maintains established trends or management direction. Section 1502.14(d) of the CEQ regulations implementing NEPA requires an EIS to include the alternative of “no action.” There are two distinct interpretations of “no action” that must be considered, depending on the nature of the proposal being evaluated. The first interpretation involves the continuation of the present course of action until that action is changed. The second interpretation of “no action” involves federal decisions on proposals for projects. “No action” in such cases would mean the proposed activity would not take place, and the resulting environmental effects of from taking no action would be compared with the effects of permitting the proposed activity to go forward (CEQ 1981, Q3 [48 Fed. Reg. 18027]). In the case of this EIS, the second interpretation of “no action” applies; therefore, Alternative A is the no-action alternative.

nonattainment areas. Areas of the country where air pollution levels persistently exceed the national ambient air quality standards of the EPA.

nonconforming use. Section 4(c) of the Wilderness Act of 1964 (PL 88-577) identifies prohibited uses, otherwise known as nonconforming uses, in wilderness. Nonconforming uses include a prohibition on commercial enterprises, mechanized equipment such as motorboats, and manmade structures.

O

ocean acidification. The chemical changes in the ocean as a result of carbon dioxide emissions.

offshore. In this document, the term offshore is used to refer to operations and facilities in Drakes Estero, including intertidal areas such as the shoreline and mudflats. This definition is not limited by any other agency's definition of the term. For instance, NOAA generally uses the term offshore to refer to open ocean; this document uses the term to refer to the estuarine environment of Drakes Estero, as well.

Olympia oysters. Otherwise known as *Ostreola conchaphila*, Olympia oysters are native to the Pacific coast. This species has not been permitted for cultivation within Drakes Estero since 1979. The last record of sale of this species at the site is from July 1963.

onshore. In this document, the term onshore generally refers to those areas above mean high tide but also may include items that stretch into the intertidal area, such as the main dock.

Ostrea edulis. See "European flat oysters."

Ostreola conchaphila. See "Olympia oysters."

outwelling. The process by which coastal habitats produce an excess amount of carbon and release organic nutrients into the surrounding area, creating an increase in productivity.

ozone, 1-hour. One of several classifications for areas designated "nonattainment" by the EPA; this standard is attained when the expected number of days per calendar year with maximum hourly average ozone concentrations above 0.12 ppm is less than or equal to one.

ozone, 8-hour. One of several classifications for areas designated "nonattainment" by the EPA; this standard is attained when the three-year averages of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

ozone transport region. The Clean Air Act sets out specific requirements for a group of northeast states that make up the Ozone Transport Region. States in this region are required to submit a State Implementation Plan and install a certain level of controls for the pollutants that form ozone, even if they meet the ozone standards.

P

Pacific decadal oscillation. Pacific Ocean phenomena which result in changes to wind persistence and intensity as well as ocean temperatures and climatic events.

Pacific oysters. Otherwise known as *Crassostrea gigas*, Pacific oysters are native to Japan and are the primary shellfish species cultivated in Drakes Estero.

paleontological resources. A resource related to the forms of life existing in prehistoric or geologic times, such as fossils of plants, animals, and other organisms.

palustrine. Relative to wetlands, the palustrine wetland system includes all nontidal wetlands dominated by trees, lichens, shrubs, persistent emergents, or emergent mosses. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes.

park. Any one of the hundreds of areas of land and water administered as part of the national park system. “Park” is synonymous with “Seashore” which is used throughout this EIS to identify Point Reyes National Seashore.

particulate matter (PM). Also known as particle pollution; a complex mixture of extremely small particles and liquid droplets made up of organic chemicals, metals, soil, dust, and acid particles.

pastoral zone. The enabling legislation specifically recognized the dairying and ranching operations by limiting the use of eminent domain within an area known as the “pastoral zone.” The pastoral zone was depicted on map number NS-PR-7002, dated August 15, 1961. Congress ratified this map by specifically referring to it in section 4 of the legislation which provided:

No parcel of more than five hundred acres within the zone of approximately twenty-six thousand acres depicted on map number NS-PR-7002, dated August 15, 1961...shall be acquired without the consent of the owner so long as it remains in its natural state, or is used exclusively for ranching and dairying purposes including housing directly incident thereto. (PL 87-657, section 4, September 13, 1962, 76 Stat. 538)

The section additionally defined ranching and dairying purposes as “such ranching and dairying, primarily for the production of food, as is presently practiced in the area” (PL 87-657, section 4, September 13, 1962, 76 Stat. 538). The administrative history of the Seashore identifies several rationales behind the creation of the pastoral zone and the special treatment of ranching and dairying operations within the zone: responding to the concerns of ranchers, lessening the cost of initial land acquisitions, stabilizing the county’s property tax base, and preventing commercial development within the area.

pelagic zone. Of or pertaining to the open seas or oceans, as opposed to the subtidal or intertidal zones. The biological community of the pelagic zone consists of phytoplankton, or small or microscopic free-floating plants, which are the predominant source of primary productivity via photosynthesis

perennial. Plants having a life cycle lasting more than two years; streams lasting or continuing throughout the entire year.

physiological. Being in accord with or characteristic of the normal functioning of a living organism.

phytoplankton. Plankton consisting of free-floating algae, protists, and cyanobacteria. Phytoplankton form the beginning of the food chain for aquatic animals and fix large amounts of carbon, which would otherwise be released as carbon dioxide.

pinniped. Any of various carnivorous, aquatic mammals of the group Pinnipedia, which some believe is a

suborder of the Carnivora but others consider a separate mammalian order. Pinnipeds have long, smooth bodies and finlike flippers for swimming. Seals and walruses are pinnipeds.

piscivorous. Habitually feeding on fish.

pollen core analysis. Study of the plant life of a certain period using the remains of pollen grains found in the soils of the same period. The proportions of the pollen grains representing different species give an indication of the type and mix of flora.

pollutants. The introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem (i.e., physical systems or living organisms). Pollution can take the form of chemical substances, or energy, such as noise, heat, or light. Pollutants, the elements of pollution, can be foreign substances or energies, or naturally occurring; when naturally occurring, they are considered contaminants when they exceed natural levels.

population (or species population). A group of individual plants or animals that have common characteristics and interbreed among themselves and not with other similar groups.

potential wilderness. See “congressionally designated potential wilderness area.”

pneumatic hammers/drills. A hammer driven by compressed air. Pneumatic hammers are used to break apart clusters of Pacific oysters (particularly those grown using the Japanese hanging culture method).

predation. Describes a biological interaction where a predator (an organism that is hunting) feeds on its prey, (the organism that is attacked). Predators may or may not kill their prey prior to feeding on them, but the act of predation always results in the death of the prey. The other main category of consumption is detritivory, the consumption of dead organic material. It can at times be difficult to separate the two feeding behaviors, for example where parasitic species prey on a host organism and then lay their eggs on it for their offspring to feed on its decaying corpse. The key characteristic of predation however is the predator’s direct impact on the prey population. On the other hand, detritivores simply eat what is available and have no direct impact on the “donor” organism(s).

predator. An organism that hunts and feeds on its prey (the organism that is attacked). Predators may or may not kill their prey prior to feeding on them, but the act of predation always results in the death of the prey.

preserve. To protect from loss or harm; conserve. Historically, the terms preserve, protect and conserve have come collectively to embody the fundamental purpose of the NPS—preserving, protecting and conserving the national park system.

primary productivity. A measure of the rate at which new organic matter is developed through photosynthesis and chemosynthesis in producer organisms based on the oxygen released and carbon taken in; the transformation of chemical or solar energy to biomass.

private tideland. Land not owned by the State of California. CFGC does not issue leases for aquaculture operations on private tidelands, and CDFG does not collect lease fees or privilege use taxes from private tideland operators. Instead, private tideland operators make payments to the entity that holds title to these tidelands.

production limit. The average annual production over a rolling three year period, which would include the current year and the two previous years. Annual harvest is reported in pounds of shellfish per year. Specifically, the weight of Pacific oysters is calculated assuming 100 oysters per gallon (per California Fish and Game Code Section 15406.7) for shucked product and 8.5 pounds per gallon. Manila clams are calculated as 30 clams per pound.

public scoping (also external scoping). The early involvement of the interested and affected public.

pupping season. Harbor seal pup-birthing season occurs within Drakes Estero between March 1 and June 30.

Purple-hinged rock scallops. Otherwise known as *Crassadoma gigantea*, purple-hinged rock scallops are native to the California rocky coast. Lease M-438-02 was established in Drakes Estero in 1979 for the purpose of experimentally cultivating this species. The last record of this species being sold at the site was May 1994.

R

rack culture. A type of oyster cultivation which uses wooden racks to support “off-bottom” cultivation methods such as Japanese hanging culture and the French tube culture.

radiocarbon dating. The determination of the age of objects of organic origin by measurement of the radioactivity of their carbon content.

reasonable alternatives. CEQ has defined reasonable alternatives as those that meet the project objective to a large degree and are economically and technically feasible. Alternatives that cannot be implemented or that do not resolve the need for action nor fulfill the stated purpose (to a large degree) should be eliminated from further analysis. DO-12 further states that options that are unreasonably expensive, that do not meet park mandates, that are inconsistent with park statements of purpose and significance or management objectives, or that have severe environmental consequences may also be unreasonable alternatives to consider, though none of these factors automatically renders it so.

record of decision (ROD). A concise public record of decision prepared by a federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).

reservation of use and occupancy (RUO). An arrangement that allows for residents to continue to use and/or occupy their property for a set period of time after selling their property to the U.S. government.

riparian. Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

roosting. A resting state or period of relative inactivity employed by birds to save energy and compensate for the high metabolic rates that occur during the active part of the day. Sleeping birds often use a type of

sleep known as vigilant sleep, where periods of rest are interspersed with quick eye-opening ‘peeks,’ allowing them to be sensitive to disturbances and enable rapid escape from threats.

S

sacred sites. Places which have established religious meaning and locales of private ceremonial activities of the American Indian tribes, including Native Alaskans.

salinity. The saltiness or dissolved salt content of a body of water. It is a general term used to describe the levels of different salts such as sodium chloride, magnesium and calcium sulfates, and bicarbonates.

scoping. An early and open process for determining the extent and variety of issues to be addressed and for identifying the significant issues related to a proposed action (40 CFR 1501.7).

scrublands. An area of land that is uncultivated and covered with sparse stunted vegetation.

scrub-shrub vegetation. The class scrub-shrub wetland includes areas dominated by woody vegetation less than 20 feet (6 meters) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

sediment. Any particulate matter that can be transported by fluid flow, and which eventually is deposited.

semidiurnal. Pertaining to, consisting of, or accomplished in half a day; occurring every 12 hours or twice each day.

sessile. Permanently attached or fixed and not free-moving, as corals and mussels.

setting tanks. The setting tanks located onshore provide a location for remote setting. Remote setting is a human-controlled process by which shellfish larvae imported for DBOC mariculture operations are grown on site to the stage of maturity marked by attachment to cultch material, at which point the larvae become seed.

shellfish. Any aquatic invertebrate having a shell or shell-like carapace, especially such an animal used as human food. Examples are crustaceans such as crabs and lobsters and molluscs such as oysters.

socioeconomic. The study of the relationship between economic activity and social life.

sorting room. A room in the processing plant where workers sort the oysters.

soundscape. the aggregate of all the natural, nonhuman-caused sounds that occur in parks, together with the physical capacity for transmitting natural sounds.

special-status species. Special-status species include plant and animal species that have regulatory protection under current federal and state laws. Federal protection is afforded through the Endangered Species Act of 1973 (ESA), which is administered by USFWS and NMFS. In California, state protection is afforded through the California ESA, which is administered by CDFG. Additional protection is afforded by the Marine Mammal Protection Act and the Migratory Bird Treaty Act.

The USFWS defines an “endangered” species as one that is in danger of extinction throughout all or a significant portion of its range. A “threatened” species is one that is likely to become endangered in the foreseeable future. The USFWS maintains a list of plants and animals native to the U.S. that are ESA candidates or are proposed for possible addition to the federal list.

special use permit (SUP). An authorization from an appropriate government body (as a zoning board) for a use of property that is a special exception: lawful approval for a special exception.

species diversity. The variety of different species present in a given area; species diversity takes into account both species richness and the relative abundance of species.

splash zone. The very upper zone within intertidal rocky shore habitats which is rarely submerged. species such as periwinkle snails, barnacles, and some types of green algae have adapted to live in the splash zone.

State Historic Preservation Officer (SHPO). Responsible for the operation and management of the Office of Historic Preservation, as well as long range preservation planning.

state-managed tideland. Lands owned by the State of California. These tideland leases are managed by the CDFG, which collects annual payments from operators. Payments include an annual lease fee based on the number of acres in the lease and annual privilege use taxes. The CDFG also has authority to regulate aspects of the operations on these lands.

stringers. Wooden boards (usually 3-inch by 4-inch or 2-inch by 4-inch boards) that overlap and line across the bents and extend the length of each oyster rack.

substrate. The earthy material that exists in the bottom of a marine habitat, like dirt, rocks, sand, or gravel.

subtidal zone. An area within the coastal marine environment in which various species of kelp are dominant. This area is submerged most of the time, exposed briefly during extreme low tides around full and new moon events. This zone provides habitat to a large diversity of plants and animals in contrast to the other zones.

superintendent. The senior on-site NPS official in a park. Used interchangeably with “park superintendent,” “park manager,” or “unit manager.”

T

take. Take is defined differently depending on the governing legislation (i.e., Title 36 CFR, Endangered Species Act, and Migratory Bird Treaty Act).

“Take” as it applies to Title 36 CFR and as stated in 36 CFR 1.4 means to pursue, hunt, harass, harm, shoot, trap, net, capture, collect, kill, wound, or attempt to do any of the above.

“Take” as it applies to the Endangered Species Act and as stated in the Act section 3.19 means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in

any such conduct. Harass is defined by Fish and Wildlife Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding feeding or sheltering. Harm is further defined by the Fish and Wildlife Service to include significant habitat modification or degradation that results in death to listed species by significantly impairing behavioral patterns such as breeding, feed or sheltering (50 CFR 17.3).

“Take” as it applies to the Migratory Bird Treaty Act and as stated in 50 CFR 10.12, includes pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect. Executive Order 13186 which calls for an MOU that has not been completed by NPS or other land management agencies defines intentional and unintentional take.

temperate. Marked by moderate temperatures, weather, or climate.

terrestrial resource. A natural resources present on land.

tide and submerged land. The California General Assembly granted to the U. S. “all right, title, and interest of the State of California, held by the state by virtue of its sovereign in and to all of the tide and submerged lands or other lands beneath navigable waters situated within the boundaries of the Point Reyes National Seashore. . .” (chapter 983, section 1, Statutes of California, July 9, 1965). This bill is included in appendix B of this document.

traditional cultural property. A property associated with cultural practices, beliefs, the sense of purpose, or existence of a living community that is rooted in that community’s history or is important in maintaining its cultural identity and development as an ethnically distinctive people. Traditional cultural properties are ethnographic resources eligible for listing in the National Register of Historic Places.

transient. Not lasting, enduring, or permanent; transitory.

triploid stock. A best management practice in shellfish mariculture; effectively sterile stock, with three sets of chromosomes rather than two.

trophic levels. A step in a nutritive series, or food chain, of an ecosystem. The organisms of a chain are classified into these levels on the basis of their feeding behavior. The first and lowest level contains the producers, green plants. The plants or their products are consumed by the second-level organisms-the herbivores, or plant eaters. At the third level, primary carnivores, or meat eaters, eat the herbivores; and at the fourth level, secondary carnivores eat the primary carnivores. These categories are not strictly defined, as many organisms feed on several trophic levels.

tunicate. Any of various primitive marine chordate animals of the subphylum Tunicata, having a rounded or cylindrical body that is enclosed in a tough outer covering. Tunicates start out life as free-swimming, tadpolelike animals with a notochord (a primitive backbone), but many, such as the sea squirts, lose the notochord and most of their nervous system as adults and become fixed to rocks or other objects. Tunicates often form colonies.

turbidity. Muddy or opaque, as a liquid clouded with a suspension of particles.

U

unacceptable impacts. Impacts that, individually or cumulatively, would

- be inconsistent with a park's purposes or values, or impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process, or
- create an unsafe or unhealthful environment for visitors or employees, or
- diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values, or
- unreasonably interfere with
 - park programs or activities, or
 - an appropriate use, or
 - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park.
 - NPS concessioner or contractor operations or services.

untrammled. Essentially unhindered and free from modern human control or manipulation, as articulated in the Wilderness Act of 1964 and further defined in the handbook *Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character across the National Wilderness Preservation System* (Landres et al. 2008).

Upper Cretaceous Period. Circa 100 million years ago to 65 million years ago.

V

Venerupis philippinarum. See "Manila clams."

viewsheds. An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point. The term is used widely in such areas as urban planning, archaeology, and military science. In urban planning, for example, viewsheds tend to be areas of particular scenic or historic value that are deemed worthy of preservation against development or other change. Viewsheds are often spaces that are readily visible from public areas such as from public roadways or public parks. The preservation of viewsheds is frequently a goal in the designation of open space areas, green belts, and community separators.

visitant. A migratory bird that is present in a particular region only at certain times.

visitor. Anyone who physically visits a park for recreational, educational or scientific purposes, or who otherwise uses a park's interpretive and educational services, regardless of where such use occurs (e.g., via Internet access, library, etc.).

visitor experience. The perceptions, feelings, and reactions a park visitor has in relationship with the surrounding environment.

visitor service. Public accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the unit of the national park system in which they are located (16 U.S.C. 5951[b] to 5952; 36 CFR 51.3).

W

wading birds. Birds that wade to forage in fresh or brackish water.

water quality. The physical, chemical, and biological characteristics of water that measure the condition of water relative to the requirements of various species or a particular purpose and need.

watershed. The region or area drained by a river, stream, etc.; drainage area.

Western Hemisphere Shorebird Reserve Network. A conservation strategy launched in 1986, after scientists from around the Americas began documenting serious population declines in shorebirds. Recognizing that these birds were in trouble prompted the science community to take action and develop the framework for an international strategy to protect shorebirds and their habitats. The Network aligns with the simple strategy that we must protect key habitats throughout the Americas in order to sustain healthy populations of shorebirds.

wetlands. Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Classification of Wetlands and Deepwater Habitats of the United States [Cowardin et al. 1979]).

wilderness. See “congressionally designated wilderness.”

Z

zooplankton. The aggregate of animal or animal-like organisms in plankton.

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A

EXISTING NPS AUTHORIZATIONS

- Special Use Permit
- Reservation of Use and Occupancy

SPECIAL USE PERMIT

Form 10-114
Rev. Jan. 00

Page 1 of 17

UNITED STATES DEPARTMENT OF THE INTERIOR
National Park Service
Special Use Permit

Name of Use: Aquaculture

Date Permit Reviewed 2008
Reviewed 20
Reviewed 20
Expires November 30, 2012

Long Term X
Short Term

Permit # MISC-8530-6000-8002

Type Park Code No. #

Point Reyes National Seashore

Drakes Bay Oyster Company
17171 Sir Francis Drake Blvd.
Inverness, CA 94937
(415) 669-1149

is hereby authorized for a period ("Term") commencing on April, 2008 ("Commencement Date") and terminating on November 30, 2012 ("Expiration Date") to use the following described land, improvements, and waters in the following area:

the lands and improvements at Drakes Bay Estero at the former Johnson's Oyster Site consisting of approximately 1.1 acres of land and improvements designated as the "SUP Area" on the map attached hereto as Exhibit B ("Drake's Estero Oysters - SUP & ROP"); the waters designated as the "SUP Area" on the map attached hereto as Exhibit A ("Drake's Estero Aquaculture & CDFG Leases: NPS Resources and SUP Area"); the land designated as the "Well Area" on the map attached hereto as Exhibit D ("Drakes Bay Oyster Company Well Area"); and the land designated as the "Sewage Area" on the map attached hereto as Exhibit E ("Drakes Bay Oyster Company Sewage Area").

Collectively, the areas so designated shall be referred to as the "Premises." The Premises governed by this Permit do not include the area designated as the ROP Area on the map attached hereto as Exhibit B.

For the purpose(s) of:

Use of the area designated as the "SUP Area" on the map attached hereto as Exhibit B for the purpose of processing shellfish, the interpretation of shellfish cultivation to the visiting public, and residential purposes reasonably incidental thereto. Use of the area designated as the "SUP Area" on the map attached hereto as Exhibit A for the purpose of shellfish cultivation. Use of the area designated as the "Well Area" on the map attached hereto as Exhibit D for the purpose of supplying water for the Drakes Bay Oyster Company facilities using Permittee well, pump, and pipelines. Use of the area designated as the "Sewage Area" on the map attached hereto as Exhibit E for the purpose of use and maintenance of existing sewage pipeline and sewage leachfield to service the Drakes Bay Oyster Company facilities. Collectively, the uses set forth in this paragraph shall be referred to as the "Permitted Uses."

Authorizing legislation or other authority (RE - DO-53): 16 U.S.C. 1, 1a-1, 3 & 459c; the Reservation of Use and Occupancy.

NEPA & NHPA Compliance: NEPA compliance pending

PERFORMANCE BOND: Required Not Required X Amount:

LIABILITY INSURANCE: Required X Not Required Amount: As set forth in Article 15 of this Permit.

ISSUANCE of this Permit is subject to the terms, covenants, obligations, and reservations, expressed or implied herein and to the payment to the U.S. Dept. of the Interior, National Park Service of the sum of **\$2,800.00** per year, plus an amount to be determined by appraisal for the use of the Sewage Area and the Well Area including water use.

PERMITTEE:  Drakes Bay Oyster Co. 4/22/08
Signature Organization Date

Authorizing Official:  George Turnbull 4/22/08
Signature Deputy Regional Director Date

CONDITIONS OF THIS PERMIT

1) DEFINITIONS

As used in this Permit, the following terms shall have the following meanings:

- a) "Agency" means any agency, department, commission, board, bureau, office or other governmental authority having jurisdiction.
- b) "Applicable Laws" includes, without limitation all present and future statutes, regulations, requirements, Environmental Requirements, guidelines, judgments, or orders of any Agency or judicial body, whether now existing or hereafter established, relating to or affecting the Premises or the use or occupancy of the Premises.
- c) "Commencement Date" is as defined on the Cover Page of this Permit.
- d) "Cyclic Maintenance" means (i) the performance by Permittee of all repairs, maintenance, or replacement-in-kind necessary to maintain the Premises and the existing improvements thereon in good order, condition, and repair; (ii) housekeeping and routine and periodic work scheduled to mitigate wear and deterioration without materially altering the appearance of the Premises; (iii) the repair or replacement-in-kind of broken or worn-out elements, parts or surfaces so as to maintain the existing appearance of the Premises; and (iv) scheduled inspections of all building systems on the Premises.
- e) "Default" means Permittee's failure to keep and perform any of the Provisions of this Permit.
- f) "Environmental Requirements" means, without limitation, all standards or requirements relating to the protection of human health or the environment such as:
 - a. standards or requirements pertaining to the reporting, permitting, management, monitoring, investigation or remediation of emissions, discharges, releases, or threatened emissions, releases or discharges of Hazardous Materials into the air, surface water, groundwater, or land;
 - b. standards or requirements relating to the manufacture, handling, treatment, storage, disposal, or transport of Hazardous Materials; and
 - c. standards or requirements pertaining to the health and safety of employees or the public.
- g) "Expiration Date" is as defined on the Cover Page of this Permit.
- h) "Hazardous Materials" means, without limitation, any material or substance, whether solid, liquid, or gaseous in nature,
 - a. the presence of which requires reporting, permitting, management, monitoring, investigation or remediation under any Environmental Requirement;
 - b. that is or becomes defined as a "hazardous waste," "extremely hazardous waste," "restricted hazardous waste," "hazardous substance," "pollutant," "discharge," "waste," "contaminant," or "toxic contaminant" under any Environmental Requirement, or any above-ground or underground storage containers for the foregoing;
 - c. that is toxic, explosive, corrosive, flammable, infectious, radioactive, reactive, carcinogenic, mutagenic, or otherwise hazardous to human health or the environment and is or becomes regulated under any Environmental Requirement;
 - d. that contains gasoline, diesel fuel or other petroleum hydrocarbons or derivatives or volatile organic compounds, or is an above-ground or underground storage container for same;

- e. that contains polychlorinated biphenyls (PCBs), asbestos, asbestos-containing materials or urea formaldehyde foam insulation; or
- f. that contains radon gas.
- i) "Hazardous Materials Occurrence" means any use, generation, treatment, keeping, storage, transport, release, disposal, migration, or discharge of any Hazardous Materials from, on, under or into the Premises or Point Reyes National Seashore ("Point Reyes") that causes any environmental contamination.
- j) "Improvements or Alterations" means any construction that does not fall within the definition of Cyclic Maintenance.
- k) "NPS" means the management officials in charge of the administration and operation of Point Reyes, including the Superintendent or his/her designee(s).
- l) "Park" means, without limitation, all lands, waters and structures within the legislative boundaries of the Point Reyes National Seashore, all natural and cultural resources within such boundaries, and any other property within such boundaries belonging to Point Reyes. As appropriate given the context, this term also includes the visiting public and/or Point Reyes employees.
- m) "Permit" means this instrument which contains those certain termination and revocation provisions as provided for herein.
- n) "Permitted Uses" is as defined on the Cover Page of this Permit.
- o) "Personal Property" means all furniture, fixtures, equipment, appliances and apparatus placed on the Premises that neither are attached to nor form a part of the Premises. Personal Property also includes any trailers, modular units, and/or temporary structures owned by Permittee.
- p) "Point Reyes" means Point Reyes National Seashore.
- q) "Premises" is as defined on the Cover Page of this Permit.
- r) "Provision" shall mean any term, agreement, covenant, condition or provision of this Permit or any combination of the foregoing.
- s) "ROP" or "Reservation of Use and Occupancy" means the Reservation of Use and Occupancy purchased by the Permittee in 2005. In 1972 the United States of America purchased Johnson Oyster Company's property, subject to a Reservation of Use and Occupancy on approximately 1.5 of those acres for a period of forty (40) years. This Reservation of Use and Occupancy expires on November 30, 2012.
- t) "SUP" means this Permit.
- u) "Term" is as defined on the Cover Page of this Permit.
- v) "Termination Date" means the Expiration Date or such earlier date as this Permit is terminated or revoked pursuant to any Provision of this Permit.

2) GENERAL CONDITIONS

- a) The Permittee shall exercise this privilege subject to the supervision of the Superintendent, and shall comply with all Applicable Laws.
- b) Permit and Approvals – Except as otherwise provided in this Permit, Permittee shall be responsible for obtaining, at its sole cost and expense, all necessary permits, approvals or other authorizations relating to Permittee's use and occupancy of the Premises.

- c) Damages - The Permittee shall pay the United States for any damage resulting from this use which would not reasonably be inherent in the use which the Permittee is authorized to make of the land and areas described in this Permit.
- d) Benefit - Neither Members of, nor Delegates to Congress, or Resident Commissioners shall be admitted to any share or part of this Permit or derive, either directly or indirectly any pecuniary benefits to arise therefrom: Provided, however, that nothing herein contained shall be construed to extend to any incorporated company if the Permit be for the benefit of such corporation.
- e) Assignment and Subletting - This Permit may not be transferred or assigned without the consent of the Permitter, in writing. Permittee shall not sublet the Premises or any part thereof or any property thereon, nor grant any interest, privilege or license whatsoever in connection with this Permit without the prior written approval of the Permitter.
- f) Revocation - This Permit may be terminated upon Default or at the discretion of the Permitter.
- g) The Permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation [Re: 36 CFR 2.32(4)]

3) USE OF PREMISES

- a) Permittee is authorized to use the Premises only for the Permitted Uses.
- b) Permittee shall not engage in any activity that may be dangerous or harmful to persons, property, or the Park; that constitutes or results in waste or unreasonable annoyance (including, without limitation, signage and the use of loudspeakers or sound or light apparatus that could disturb park visitors and wildlife outside the Premises); that in any manner causes or results in a nuisance; or that is of a nature that it involves a substantial hazard, such as the manufacture or use of explosives, chemicals or products that may explode.
- c) The Parties hereby acknowledge and agree that Permittee's covenant that the Premises shall be used as set forth in this Article 3 is material consideration for Permitter's agreement to enter into this Permit. The Parties further acknowledge and agree that any violation of said covenant shall constitute a Default under this Permit and that Permitter may inspect the premises at any time.
- d) This Permit is subject to the right of the NPS to establish trails and other improvements and betterments over, upon, or through the Premises and further to the use by travelers and others of such established or existing roads and trails. The Permittee understands that occasional park visitors are authorized to walk, use non-motorized watercraft, or hike in the various areas included in this Permit even though no trails are formally established.
- e) Permitter reserves the right for Permitter, its employees, contractors and agents to enter and to permit any Agency to enter upon the Premises for the purposes of inspection, inventory or when otherwise deemed appropriate by the Permitter for the protection of the interests of Permitter, including Permitter's interests in any natural or cultural resources located on, in or under the Premises.
- f) Permitter reserves the right at any time to close to travel any of its lands, to erect and maintain gates at any point thereon, to regulate or prevent traffic of any kind thereon, to prescribe the methods of use thereof, and to maintain complete dominion over the same; provided, however, that at all times during the Term, Permitter shall provide Permittee and Permittee's invitees with reasonable access to the Premises subject only to interruptions caused by necessary maintenance or administrative operations or by matters beyond Permitter's control.
- g) Permittee hereby waives any claim for damages for any injury, inconvenience to or interference with Permittee's use and occupancy of the Premises, any loss of occupancy or quiet enjoyment of the Premises, or any other loss occasioned by Permitter's exercise of its rights under this Article 3 except to the extent that the damages, expenses, claims or suits result from the willful misconduct or gross negligence of Permitter, its employees, contractors or agents; provided, further, that Permitter shall be liable only to the extent such claims are allowed

under the Federal Tort Claims Act.

- h) Members of the general public visiting the Drakes Bay Oyster Company operation may park in the adjacent NPS parking area and walk over to the SUP or ROP areas.
- i) While Permittee is permitted to use and operate motorized watercraft in Drakes Estero for the purpose of conducting daily business operations, which can include occasional inspections required by Agencies, no other use of Permittee's motorized watercraft is authorized. No motorized watercraft may enter the designated wilderness boundary (See "Existing Wilderness" on map attached hereto as Exhibit A). To protect water quality in the Estero, any additional or replacement boat motors obtained by Permittee must be four stroke motors.
- j) Due to a lack of adequate parking space and restroom facilities for the public, barbecuing is not permitted in the Special Use Permit Area. To comply with this paragraph, Permittee will not encourage barbecuing in the SUP Area. Picnic tables will be provided by the NPS at the adjacent parking area.
- k) Unauthorized discharge into the estuary is prohibited. This prohibition includes any discharge from processing facilities. Notwithstanding the foregoing, discharge of oyster wash water from dock and from hatchery operations is allowed if authorized by relevant Agencies.
- l) In order to ensure public health and safety, Permittee will ensure that Permittee and Permittee's officers, agents, employees, and contractors comply with Applicable Laws regarding pets, including the NPS regulation at 36 C.F.R. § 2.15.
- m) In order to ensure public health and safety, Permittee shall allow all appropriate Federal, State and/ or County agencies; including the United States Department of Health and Human Services, the State of California Department of Health Services and Marin County Community Development Agency Environmental Health Services, to conduct inspections on a routine basis.

4) SPECIAL PERMIT CONDITIONS

- a) If Permittee and Permitter disagree about an issue related to this Permit, they will first make a good faith effort to resolve such issue at the Park level. If they are unable to resolve the issue at the Park level, Permittee may request a review of the issue by the Regional Director.
- b) Based upon the findings of an independent science review and/or NEPA compliance, Permitter reserves its right to modify the provisions of this Article 4. Permitter further reserves its right to incorporate new mitigation provisions based upon the findings of an independent science review.
 - i) Production of all shellfish species shall be capped at the "current production level" as determined under the California Coastal Commission Consent Order No. CCC-07-CD-04.
 - ii) No additional aquaculture racks and/or cultivation infrastructure will be constructed without the prior approval of the Permitter. Operation, repair, and maintenance of infrastructure currently being used for oyster cultivation is permitted.
 - iii) Permittee and Permitter acknowledge the importance of eelgrass within the ecology of the estuary. Permittee will not place bags for shellfish production onto eelgrass.
 - iv) Within sixty (60) days following the signing of this interim Permit, Permittee will submit for National Park Service approval a boating operations plan, which will indicate dedicated navigation routes, chosen to minimize impacts to eelgrass beds when accessing aquaculture racks and/or cultivation equipment.
 - v) To minimize the chances of introducing invasive species or pathological microorganisms to Drake's Estero, Permittee will only import shellfish in the form of larvae and seed. Within 30 days of the Commencement Date, Permittee shall produce sufficient evidence, for the review and approval of the Permitter, that larvae and seed from outside sources have been certified by the California Department of Fish and Game ("CDFG")

to be free of pathogens. If the Permittee determines that the documentation is insufficient, Permittee shall cease from importing larvae within 30 days of receiving notification of the determination from the Permitter.

- vi) Permittee will not introduce species of shellfish beyond those described in the existing leases from the CDFG. Permittee may seek to conform and/or modify these leases with the CDFG. Any modifications approved by CDFG will be considered by Permitter on a case-by-case basis, and Permittee may not implement any such modifications without the prior written approval of the Permitter.
- vii) Permittee must avoid disturbance to marine mammals and marine mammal haul-out sites. The Marine Mammal Protection Act, 16 U.S.C. 1361 et seq., includes a prohibition against any act of pursuit, torment or annoyance that has the potential to injure or disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. The National Oceanic and Atmospheric Administration (NOAA) recommends maintaining a distance of at least 100 yards to avoid disturbance to seals. Permittee will maintain a distance of at least 100 yards from hauled out seals throughout the year. Permitter will monitor marine mammal populations in Drakes Estero. In addition, during the pupping harbor seal closure period, March 1-June 30, the designated wilderness area (outside of Permit area) is closed to all boats. Permittee will follow "Drakes Estero Aquaculture and Harbor Seal Protection Protocol" attached hereto as Exhibit C. If required by CDHS, watercraft may use the Main Channel identified in Exhibit C during the pupping harbor seal closure period only to access CDHS's sentinel monitoring station for marine biotoxins. Boats shall be operated at low speed, near the eastern shore, to minimize chance of disturbance to harbor seals. No other use of the Main Channel is authorized during the pupping harbor seal closure period.
- c) Permittee's agreement to the provisions of this Permit does not waive Permittee's ability to take contrary positions with regard to similar provisions with other Agencies.

5) ACCEPTANCE OF PREMISES

- a) Prior to entering into this Permit, Permittee has made a thorough, independent examination of the Premises and all matters relevant to Permittee's decision to enter into this Permit, and Permittee is thoroughly familiar with all aspects of the Premises and is satisfied that they are in an acceptable condition and meet Permittee's needs, provided that Permittee and Permitter acknowledge that certain repairs are necessary to comply with Applicable Laws. Permittee will make such repairs at its sole cost and expense in compliance with Applicable Laws.
- b) Permittee expressly agrees to use and occupy the Premises and all improvements thereon in their existing "AS IS" condition "WITH ALL FAULTS" and acknowledges that in entering into this Permit, Permittee does not rely on, and Permitter does not make, any express or implied representations or warranties as to any matters including, without limitation, the suitability of the soil or subsoil; any characteristics of the Premises or improvements thereon; the suitability of the Premises for the approved use; the economic feasibility of Permittee's use and occupancy of the Premises; title to the Premises; the presence of Hazardous Materials in, on, under or in the vicinity of the Premises; or any other matter. Permittee has satisfied itself as to such suitability and other pertinent matters by Permittee's own inquiries and tests into all matters relevant to determining whether to enter into this Permit and Permittee hereby accepts the Premises.

6) CONSTRUCTION OF IMPROVEMENTS OR ALTERATIONS

- a) Permittee may only make those Improvements or Alterations to the Premises that relate to Permittee's use of the Premises as specified in Article 3, "Use of the Premises."
- b) Permittee shall not undertake any Improvements or Alterations to the Premises (including installation of temporary equipment or facilities) without the prior written approval of Permitter.
- c) As a prerequisite to obtaining approval for Improvements or Alterations, Permittee, at Permittee's sole cost and expense, shall submit design plans and any other relevant data for Permitter's approval.
- d) Construction of Improvements or Alterations by Permittee shall be performed in accordance with all Applicable

Laws, including but not limited to general planning, building, and environmental laws and approved design plans and shall be undertaken and completed at Permittee's sole cost and expense.

- e) Permittee shall, upon request, furnish Permitter with a true and correct copy of any contract, and any modification or amendment thereof, with Permittee's contractors, architects, or any other consultants, engaged in connection with this Permit.
- f) Any Improvements or Alterations undertaken by Permittee shall be performed in a good and workmanlike manner and with materials of a quality and standard acceptable to Permitter. Permittee shall also construct, install and maintain equipment and any construction facilities on the Premises in a safe and orderly manner.
- g) Permittee shall not construct any Improvements or Alterations outside the boundaries of the Premises.
- h) Permitter in its discretion is entitled to have on the Premises at any time during the construction of Improvements or Alterations an inspector or representative who shall be entitled to observe all aspects of the construction on the Premises.
- i) All lumber utilized at the site will be processed in compliance with current laws and regulations regarding wood treatments. This includes lumber utilized in assembly and repair of aquaculture racks.
- j) As set forth in Article 17, title to any Improvements or Alterations to the Premises shall be and remain solely in the Permitter.

7) TREATMENT OF REFUSE

- a) Refuse shall be promptly removed from within the boundaries of Point Reyes National Seashore and shall be disposed of in accordance with Applicable Laws.
- b) Permittee will make best efforts to remove debris associated with aquaculture production operations including wood from racks, plastic spacers, unused shellfish bags, shellfish shells, and any other associated items.

8) PESTICIDE AND HERBICIDE USE

- a) The National Park Service utilizes Integrated Pest Management ("IPM") to treat pest and vegetation problems. The goal of IPM is to use the least-toxic, effective methods of controlling pests and vegetation. Except for normal household purposes, Permittee shall not use any pesticides that do not comply with the IPM program. To this end, Permittee shall submit in writing to Permitter, a request for the use of pesticide(s) or herbicide(s) and shall not use any pesticide(s) or herbicide(s) until Permittee has received an express written authorization therefor from Permitter.
- b) Permittee shall manage, treat, generate, handle, store and dispose of all pesticides and herbicides in accordance with Applicable Laws, including reporting requirements.

9) FIRE PREVENTION AND SUPPRESSION

- a) Permittee and its employees, agents, and contractors shall, in Permittee's use and occupancy of the Premises, take all reasonable precautions to prevent forest, brush, grass, and structural fires and shall, if safety permits, assist the Permitter in extinguishing such fires on the Premises.

10) EXCAVATION, SITE AND GROUND DISTURBANCE

- a) Permittee shall not cut, remove or alter any timber or any other landscape feature; conduct any mining or drilling operations; remove any sand, gravel or similar substances from the ground or watercourse; commit waste of any kind; or in any manner change the contour or condition of the Premises without the prior written approval of the Permitter. Except in emergencies, Permittee shall submit requests to conduct such activities in writing to the Permitter not less than sixty (60) days in advance of the proposed commencement date of any such activities.

- b) If approval of activities referenced above in Section 10(a) is granted, Permittee shall abide by all the terms and conditions of the approval, including provisions pertaining to archaeological resources.
- c) No soil disturbance of any kind may occur in the vicinity of a known archeological site, without the presence of an NPS archeological monitor.

11) NONPOINT SOURCE POLLUTION

- a) The Permittee shall comply with all Applicable Laws regarding non-point source pollution (including the protection of beneficial uses of waters as designated by the State of California). Further, Permittee's use and occupancy of the Premises shall be designed to minimize, to the greatest extent feasible, non-point source pollution within National Park Service boundaries or on adjacent lands.
- b) Except as set forth in Section 3(k) of this Permit, no discharge into the estuary is permitted. This prohibition includes any discharge from processing facilities.

12) TREE AND VEGETATION REMOVAL

- a) The Permittee may not remove tree(s) or vegetation unless expressly approved in writing by the Permitter. The Permittee shall provide specific plans to the Permitter for desired tree(s) and vegetation removal during the annual meeting or in writing during the Term of this Permit.
- b) Removal of non-native invasive vegetation such as non-native thistles, trimming and vegetation removal around structures is permissible.

13) WILDLIFE PROTECTION

- a) Wildlife is an integral part of Point Reyes National Seashore and must be managed in accordance with all Applicable Laws, including but not limited to NPS laws, regulations, and policies.
- b) Permittee shall not engage in any activity that purposely causes harm or destroys any wildlife. Conversely, Permittee shall not engage in any activity that purposely supports or increases populations of non-native or invasive animal species, except for the cultivation of the shellfish species authorized by this Permit.
- c) On a case by case basis, the Permitter will evaluate incidences of depredation caused by Permittee and choose a course of action. The nature of the course of action will be determined by the extent and frequency of the damage, the wildlife species, and park-wide management objectives.

14) HAZARDOUS MATERIALS; ENVIRONMENTAL HEALTH AND SAFETY

- a) In connection with this Permit, Permittee, its officers, agents, employees and contractors, shall not use, generate, sell, treat, keep, or store any Hazardous Materials on, about, under or into the Premises or elsewhere in Point Reyes except in compliance with all Applicable Laws and as approved in writing by Permitter. However, Permittee shall not be obligated to obtain Permitter's approval to use, keep, or generate Hazardous Materials as necessary for the normal operation or maintenance of vehicles or for standard household cleaners. Permittee agrees to be responsible for timely acquisition of any permit(s) required for its Hazardous Materials-related activities, and shall provide to the Permitter, upon request, inventories of all such Hazardous Materials and any supporting documentation, including but not limited to material safety data sheets, uniform waste manifest forms, and/or any other pertinent permits.
- b) Permittee, its officers, agents, employees and contractors, shall not release, discharge or dispose of any Hazardous Materials from, on, about, under or into the Premises or elsewhere in Point Reyes, except as authorized by Applicable Laws.
- c) If Permittee knows of or reasonably suspects or receives notice or other communication concerning any past,

ongoing, or potential violation of Environmental Requirements in connection with the Premises or Permittee's activities, Permittee shall immediately inform Permitter and shall provide copies of any relevant documents to Permitter. Receipt of such information and documentation shall not be deemed to create any obligation on the part of the Permitter to defend or otherwise respond to any such notification.

- d) If any Hazardous Materials Occurrence is caused by, arises from, or is exacerbated by the activities authorized under this Permit or by the use of the Premises by Permittee, its officers, agents, employees or contractors, Permittee shall promptly take all actions at its sole cost and expense as are required to comply with Applicable Laws and to allow the Premises and any other affected property to be used free of any use restriction that could be imposed under Applicable Laws; provided that, except in cases of emergency, Permitter's approval of such actions shall first be obtained.
- e) The Permitter shall have the right, but not the duty, at all reasonable times and, except in the case of emergency, following at least twenty-four (24) hours advance notice to Permittee, to enter and to permit any Agency, public or private utilities and other entities and persons to enter upon the Premises, as may be necessary as determined by the Permitter in its sole discretion, to conduct inspections of the Premises, including invasive tests, to determine whether Permittee is complying with all Applicable Laws and to investigate the existence of any Hazardous Materials in, on or under the Premises. The Permitter shall have the right, but not the duty, to retain independent professional consultants to enter the Premises to conduct such inspections and to review any final report prepared by or for Permittee concerning such compliance. Upon Permittee's request, the Permitter will make available to Permittee copies of all final reports and written data obtained by the Permitter from such tests and investigations. Permittee shall have no claim for any injury or inconvenience to or interference with Permittee's use of the Premises or any other loss occasioned by inspections under this Section 14(e). Notwithstanding the foregoing, neither Permittee nor Permitter shall be required to provide a report under this Section 14(e) if such report is protected by attorney-client privilege.
- f) Should Permittee, its officers, agents, employees or contractors, fail to perform or observe any of the obligations or agreements pertaining to Hazardous Materials or Environmental Requirements for a period of thirty (30) days (or such longer period of time as is reasonably required) after notice, then Permitter shall have the right, but not the duty, without limitation of any other rights of Permitter under this Permit, personally or through its agents, consultants or contractors to enter the Premises and perform the same. Permittee agrees to reimburse Permitter for the costs thereof and to indemnify Permitter as provided for in this Permit.
- g) Permittee understands and acknowledges that the Premises may contain asbestos and lead-based paint. If Permittee performs any Improvements or Alterations, Permittee shall comply with all Environmental Requirements related to asbestos and lead-based paint and shall solely bear all costs associated therewith. Nothing in this Permit shall be construed to require Permittee to remove asbestos or lead-based paint unless Environmental Requirements require such removal.
- h) Permittee shall indemnify, defend, save and hold Permitter, its employees, successors, agents and assigns, harmless from and against, and reimburse Permitter for, any and all claims, demands, damages, injuries, losses, penalties, fines, costs, liabilities, causes of action, judgments, and expenses, including without limitation, consultant fees and expert fees, that arise during or after the Term as a result of any violation of any Environmental Requirement in connection with this Permit or any Hazardous Materials Occurrence in connection with this Permit.
- i) The provisions of this Article 14 shall survive any termination or revocation of this Permit. Article 15 (Insurance) of this Permit shall not limit in any way Permittee's or Permitter's obligations under this Article 14.

15) INSURANCE

- a) Permittee shall purchase the types and amounts of insurance described herein before the Commencement Date of this Permit unless otherwise specified. At the time such insurance coverage is purchased, Permittee shall provide Permitter with a statement of Permittee insurance describing the insurance coverage in effect and a Certificate of Insurance covering each policy in effect as evidence of compliance with this Permit. Permittee shall also provide the Permitter thirty (30) days advance written notice of any material change in the Permittee's

insurance program hereunder. Permittee shall not be responsible for any omissions or inadequacies in insurance coverage or amounts in the event such coverage or amounts prove to be inadequate or otherwise insufficient for any reason whatsoever.

- b) From time to time, as conditions in the insurance industry warrant, the Permittee reserves the right to revise the minimum insurance limits required in this Permit.
- c) All insurance policies required by this Permit shall specify that the insurance company shall have no right of subrogation against the United States, except for claims arising solely from the negligence of the United States or its employees, or shall provide that the United States is named as an additional insured.
- d) All insurance policies required herein shall contain a loss payable clause approved by the Permittee which requires insurance proceeds to be paid directly to the Permittee without requiring endorsement by the United States. Insurance proceeds covering any loss of the Premises but not used to replace such losses shall be promptly paid by Permittee to Permittee. The use of insurance proceeds for the repair, restoration or replacement of the Premises shall not give any ownership interest therein to Permittee.
- e) **Property Insurance:** At a minimum, the Permittee shall be required to purchase Basic Form Actual Cash Value (replacement cost less depreciation) insurance coverage for all residence on the Premises. Within thirty days of issuance of the Permit, the Permittee shall submit a report from a reputable insurance company which provides a full range of options for insurance coverage on all nonresidential structures on the Premises. Within thirty days of receipt of this report, the Permittee, in its sole discretion, will review and specify the type and level of insurance coverage which shall be required. The Permittee will provide the Permittee written notification of insurance requirements and the Permittee shall be required to have the specified level(s) of insurance in place within thirty days of such notification. The cost of the insurance will be deducted from the appraised fair market value for the Premises; this adjustment and the insurance requirements will be addressed in an amendment to the Permit. Permittee shall, in the event of damage or destruction in whole or in part to the Premises, use all proceeds from the above described insurance policies to repair, restore, replace or remove those buildings, structures, equipment, furnishings, betterments or improvements determined by the Permittee, in Permittee's sole discretion, to be necessary to satisfactorily discharge the Permittee's obligations under this Permit.
- f) **Public Liability:** The Permittee shall provide Comprehensive General Liability insurance against claims arising from or associated with Permittee's use and occupancy of the Premises. Such insurance shall be in the amount commensurate with the degree of risk and the scope and size of such use and occupancy, but in any event, the limits of such insurance shall not be less than \$1,000,000.00 per occurrence covering both bodily injury and property damage. If claims reduce available insurance below the required per occurrence limits, the Permittee shall obtain additional insurance to restore the required limits. An umbrella or excess liability policy, in addition to a Comprehensive General Liability Policy, may be used to achieve the required limits.
- g) Permittee shall also obtain the following additional coverage:
 - i) **Automobile Liability** – To cover all owned, non-owned, and hired vehicles in the amount of \$300,000.00.
 - ii) **Workers' Compensation** – The amount shall be in accordance with that which is required by the State of California.

16) INDEMNITY

- a) In addition to the indemnification contained in Article 14, Permittee shall indemnify, defend, save and hold Permittee, its employees, successors, agents and assigns, harmless from and against, and reimburse Permittee for, any and all claims, demands, damages, injuries, losses, penalties, fines, costs, liabilities, causes of action, judgments and expenses and the like incurred in connection with or arising in any way out of this Permit; the use or occupancy of the Premises by Permittee or its officers, agents, employees, or contractors; the design, construction, maintenance, or condition of any Improvements or Alterations; or any accident or occurrence on the Premises or elsewhere arising out of the use or occupancy of the Premises by Permittee or its officers, agents, employees, or contractors. Permittee's obligations hereunder shall include, but not be limited to, the burden and

expense of defending all claims, suits and administrative proceedings (with counsel reasonably approved by Permittee), even if such claims, suits or proceedings are groundless, false or fraudulent, and conducting all negotiations of any description, and paying and discharging, when and as the same become due, any and all judgments, penalties or other sums due against the United States.

- b) Permittee agrees to cooperate, to the extent allowed by law, in the submission of claims pursuant to the Federal Tort Claims Act against the United States by third parties for personal injuries or property damage resulting from the negligent act or omission of any employee of the United States in the course of his or her employment.
- c) This Article 16 shall survive any termination or revocation of this Permit. The provisions of Article 15 (Insurance) of this Permit shall not limit in any way Permittee's obligations under this Article 16.

17) PROPERTY INTEREST

- a) This Permit shall vest in Permittee no property interest in the Premises or in the improvements thereon. Title to real property and improvements thereon, including any Improvements or Alterations constructed by Permittee, shall be and remain solely in Permittee. Except as provided in Paragraph 3(g), Permittee shall have no claim for any compensation or damages for the Premises, the improvements thereon, or any Improvements or Alterations constructed by the Permittee.
- b) Nothing in this Permit shall give or be deemed to give Permittee an independent right to grant easements or other rights-of-way over, under, on, or through the Premises.
- c) Permittee hereby retains the sole and exclusive right to oil, gas, hydrocarbons, and other minerals (of whatsoever character) in, on, or under the Premises.

18) RENTS, TAXES AND ASSESSMENTS

- a) The annual rental rate for this Permit shall be established by Permittee and is set forth on the Cover Page of this Permit.
- b) The annual rent under this Permit is payable in advance on a semi-annual basis. Therefore, Permittee hereby agrees to pay fifty percent of the annual rate on or before November with the remaining fifty percent payable on or before May of each year during the Term.
- c) Permittee shall pay the proper Agency, when and as the same become due and payable, all taxes, assessments, and similar charges which, at any time during the Term of this Permit, are levied or assessed against the Premises.
- d) Rents due hereunder shall be paid without assertion of any counterclaim, setoff, deduction or defense and without abatement, suspension, deferment or reduction.

19) CYCLIC MAINTENANCE

- a) Permittee shall perform all Cyclic Maintenance in accordance with the Provisions of this Permit and at Permittee's sole cost and expense. Permittee is responsible for the maintenance of all fences, buildings, and other improvements upon the Premises. All improvements and facilities used and occupied by Permittee shall at all times be protected and maintained in a safe, sanitary and sightly condition.
- b) Specific maintenance requirements may be negotiated with Permittee each year as outlined in Article 21 (Annual Meeting).
- c) Docks and Fences shall be maintained in good condition and shall be timely repaired in conformance with Applicable Laws. Abandoned fences and other decrepit improvements shall be removed from the Premises and shall be disposed of outside the Park or as directed by Permittee after review and approval by the NPS Historian.

- d) New lighting under Permittee's control of the Premises shall be redesigned to protect and preserve the night sky/darkness and minimize light pollution in Drakes Estero.
- e) Parking areas shall be maintained in a safe condition and no new roads or truck trails shall be established without prior written permission of the Permitter. The main entrance road from Sir Francis Drake Boulevard to the SUP Area will be maintained by the NPS. The Park will respond in a timely manner to Permittee and/or visitor complaints regarding the condition of the main entrance road. Notwithstanding the foregoing, Permittee may enter into a road maintenance contract with Permittee.
- f) Existing water reservoirs shall be maintained in a safe and secure condition to prevent washouts and erosion and no new reservoirs shall be constructed or established without prior written approval of the Permitter.
- g) Permittee shall maintain the water, well, pump and all pipelines within the Premises. Permittee shall replace or repair any damage or loss of the water system within the Premises.
- h) Permittee shall maintain the sewage pipeline and sewage leachfield in the "Sewage Area."
- i) Permittee shall be responsible for removing slash buildup around fences or other facilities within the Premises so as to prevent fire and egress hazards. Permittee shall also be responsible for removing litter and trash from the Premises.

20) COMPLIANCE WITH APPLICABLE LAWS: NEPA, NHPA

- a) General Compliance: As provided for in this Permit, Permittee at its sole cost and expense shall promptly comply with all Applicable Laws as required by law. Permittee shall immediately notify Permitter of any notices received by or on behalf of Permittee regarding any alleged or actual violation(s) of or non-compliance with Applicable Laws. Permittee shall, at its sole cost and expense, promptly remediate or correct any violation(s) of Applicable Laws.
- b) National Environmental Policy Act and National Historic Preservation Act: Where activities undertaken by Permittee relate to the preparation of compliance documents pursuant to the National Environmental Policy Act ("NEPA") or the National Historic Preservation Act ("NHPA"), Permittee shall supply all necessary information to Permitter and any Agency in a timely manner. Permitter will pay for the preparation of NEPA or NHPA documents. If there is litigation regarding NEPA or NHPA compliance, it will not trigger the indemnification requirements of Article 16.

21) ANNUAL MEETING

- a) The Parties shall meet annually each year during the Term of this Permit for the purposes of discussing and resolving issues of mutual concern and ensuring that Permittee is complying with the Provisions of this Permit..

22) PENALTY

- a) At the option of the Permitter, Permitter may, in lieu of voiding and terminating this Permit, assess a penalty of \$50.00 per day for any failure by Permittee to keep and perform any of the Provisions of this Permit. In such case, Permittee shall be given notice in writing of a grace period (of from one to thirty days) to remedy the situation before a penalty will be assessed. Payment of any penalty under this provision shall not excuse Permittee from curing the Default. This provision shall not be construed as preventing Permitter from issuing citations or initiating enforcement proceedings under Applicable Laws.

23) SURRENDER AND VACATE THE PREMISES, RESTORATION

- a) At the conclusion of Permittee's authorization to use the Premises for the Permitted Uses, Permittee shall surrender and vacate the Premises, remove Permittee's Personal Property therefrom, and repair any damage

resulting from such removal. Subject to the approval of the Permittee, Permittee shall also return the Premises to as good order and condition (subject to ordinary wear and tear and damage that is not caused directly or indirectly by Permittee) as that existing upon the Effective Date.

- b) All Permittee's Personal Property shall remain the property of Permittee. However, if after the conclusion of Permittee's authorization to use the Premises for the Permitted Uses, Permittee shall fail satisfactorily to remove Permittee's Personal Property and so repair the Premises, then, at the Permittee's sole option, after notice to Permittee, Permittee's Personal Property, shall either become the property of the Permittee without compensation therefore, or the Permittee may cause it to be removed and the Premises to be repaired at the expense of Permittee, and no claim for damages against Permittee, its employees, agents or contractors shall be created or made on account of such removal or repair work.

24) LIMITATION ON EFFECT OF APPROVALS

- a) All rights of Permittee to review, comment upon, approve, inspect or take any other action with respect to the use and occupancy of the Premises by Permittee, or any other matter, are expressly for the benefit of Permittee and no other party. No review, comment, approval or inspection, right or exercise of any right to perform Permittee's obligations, or similar action required or permitted by, of, or to Permittee under this Permit, or actions or omissions of Permittee's employees, contractors, or other agents, or other circumstances shall give or be deemed to give Permittee any liability, responsibility or obligation for, in connection with, or with respect to the operation of the Premises, nor shall any such approval, actions, information or circumstances relieve or be deemed to relieve Permittee of its obligations and responsibilities for the use and occupancy of the Premises as set forth in this Permit.

25) WAIVER NOT CONTINUING

- a) The waiver of any Default, whether such waiver be expressed or implied, shall not be construed as a continuing waiver, or a waiver of or consent to any subsequent or prior breach of the same or any other provision of this Permit. No waiver of any Default shall affect or alter this Permit, but each and every Provision of this Permit shall continue in full force and effect with respect to any other then existing or subsequent Default.

26) LIENS

- a) Permittee shall have no power to do any act or to make any contract that may create or be the foundation for any lien, mortgage or other encumbrance upon the reversion, fee interest or other estate of the Permittee or of any interest of the Permittee in the Premises. If any such lien shall at anytime be filed against the Premises or any portion thereof, Permittee shall cause the Permittee to be discharged from the lien.

27) HOLDING OVER

- a) This Permit shall terminate upon the Termination Date and any holding over by Permittee after the Termination Date shall not constitute a renewal of this Permit or give Permittee any rights under this Permit or in or to the Premises.

28) NOTICES

- a) Any notice or other communication required or permitted under this Permit shall be in writing and shall be delivered by hand or certified mail with return receipt requested. Notices and other communications shall be addressed as follows:

If to Permitter:

Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

If to Permittee:

Mr. Kevin Lunny
Drakes Bay Oyster Company
17171 Sir Francis Drake
Inverness, CA 94937

29) NO PARTNERSHIP OR JOINT VENTURE

- a) Permitter is not for any purpose a partner or joint venturer of Permittee in the development or operation of the Premises or in any business conducted on the Premises. Permitter shall not under any circumstances be responsible or obligated for any losses or liabilities of Permittee.

30) ANTI-DEFICIENCY ACT

- a) Permittee and Permitter agree that nothing contained in this Permit shall be construed as binding Permitter to expend, in any fiscal year, any sum in excess of the appropriation made by Congress for that fiscal year in furtherance of the subject matter of this Permit, or to involve Permitter in any contract or other obligation for the future expenditure of money in excess of such appropriations.

31) COMPLIANCE WITH EQUAL OPPORTUNITY LAWS

- a) Permittee agrees that in undertaking all activities pursuant to this Permit, Permittee will comply with all Applicable Laws relating to non-discrimination.

32) ENTIRE AGREEMENT AND AMENDMENT

- a) This instrument, together with the exhibits hereto, all of which are incorporated in this Permit by reference, constitutes the entire agreement between Permitter and Permittee with respect to the subject matter of this Permit and supersedes all prior offers, negotiations, oral and written. This Permit may not be amended or modified in any respect whatsoever except by an instrument in writing signed by Permitter and Permittee.

33) NO PAYMENTS BY PERMITTER

- a) Under no circumstances or conditions, whether now existing or hereafter arising, and whether or not beyond the present contemplation of the Parties, shall Permitter be expected or required to make any payment of any kind whatsoever with respect to the Premises or be under any obligation or liability except as expressly set forth in this Permit.

34) NO THIRD PARTY BENEFICIARIES

- a) Except as expressly set forth in this Permit, this Permit shall not be deemed to confer upon any person or entity, other than the parties to this Permit as expressly set forth in this Permit, any third party beneficiary status, any right to enforce any Provision of this Permit, or any other right or interest.

35) NO PREFERENTIAL RENEWAL AND RELOCATION ASSISTANCE

- a) Permittee hereby agrees that Permittee is not a concessioner and that the provisions of law regarding National Park Service concessionaires do not apply to Permittee. No rights shall be acquired by virtue of this Permit entitling Permittee to claim benefits under the Uniform Relocation Assistance and Real Property Acquisition

Policies Act of 1970, Public Law 91-646.

36) SEVERABILITY

- a) In case any one or more of the provisions of this Permit shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this Permit, and this Permit shall be construed as if such invalid, illegal or unenforceable provisions had not been contained in this Permit.

37) EXHIBITS

- a) Each of the exhibits referenced in this Permit is attached hereto and incorporated herein.

38) TIME OF THE ESSENCE

- a) Time is hereby expressly declared to be of the essence of this Permit and of each and every Provision of this Permit.

39) HEADINGS

- a) Article, Section and Subsection headings in this Permit are for convenience only and are not to be construed as a part of this Permit or in any way limiting or amplifying the Provisions of this Permit.

40) PERMIT CONSTRUED AS A WHOLE

- a) The language in all parts of this Permit shall in all cases be construed as a whole according to its fair meaning and not strictly for or against either Permitter or Permittee. The Parties acknowledge that each party and its counsel have reviewed this Permit and participated in its drafting and therefore that the rule of construction that any ambiguities are to be resolved against the drafting party shall not be employed or applied in the interpretation of this Permit.

41) MEANING OF TERMS

- a) Whenever the context so requires, the neuter gender shall include the masculine and the feminine, and the singular shall include the plural and vice versa.

42) FEDERAL LAW

- a) The laws of the United States shall govern the validity, construction and effect of this Permit.

LIST OF EXHIBITS

- XHIBIT A: Map – Drake's Estero Aquaculture & CDFG Leases: NPS Resources and SUP Area
- XHIBIT B: Map – Drake's Estero Oysters – SUP & ROP
- XHIBIT C: Drakes Estero Aquaculture and Harbor Seal Protection Protocol
- XHIBIT D: Map – Drakes Bay Oyster Company Well Area
- XHIBIT E: Map – Drakes Bay Oyster Company Sewage Area

EXHIBIT A

Map – Drake's Estero Aquaculture & CDFG Leases: NPS Resources and SUP Area

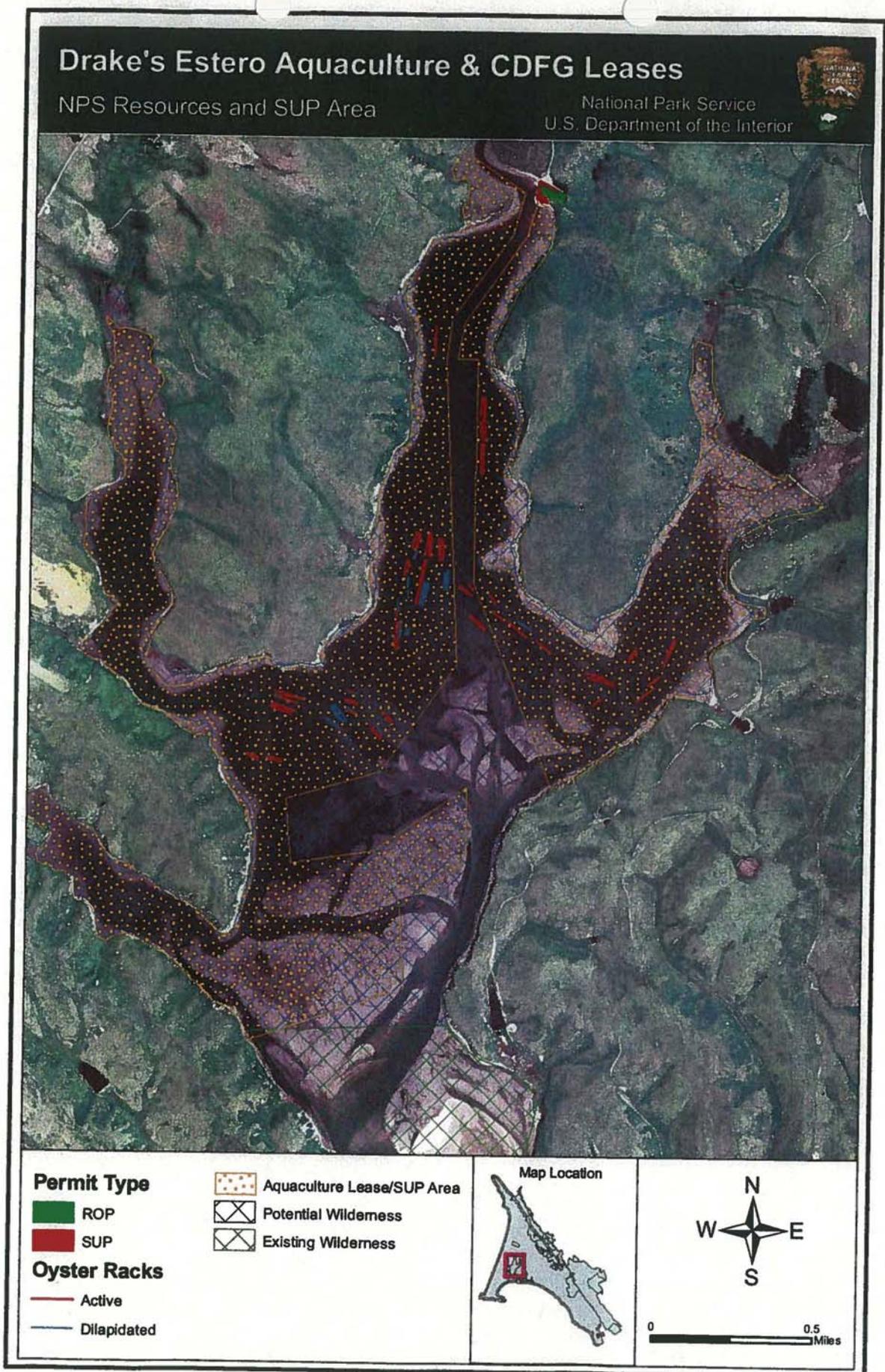


EXHIBIT B

Map – Drake's Estero Oysters – SUP & ROP

Drake's Estero Oysters - SUP & ROP



National Park Service
Point Reyes National Seashore
Marin County, CA

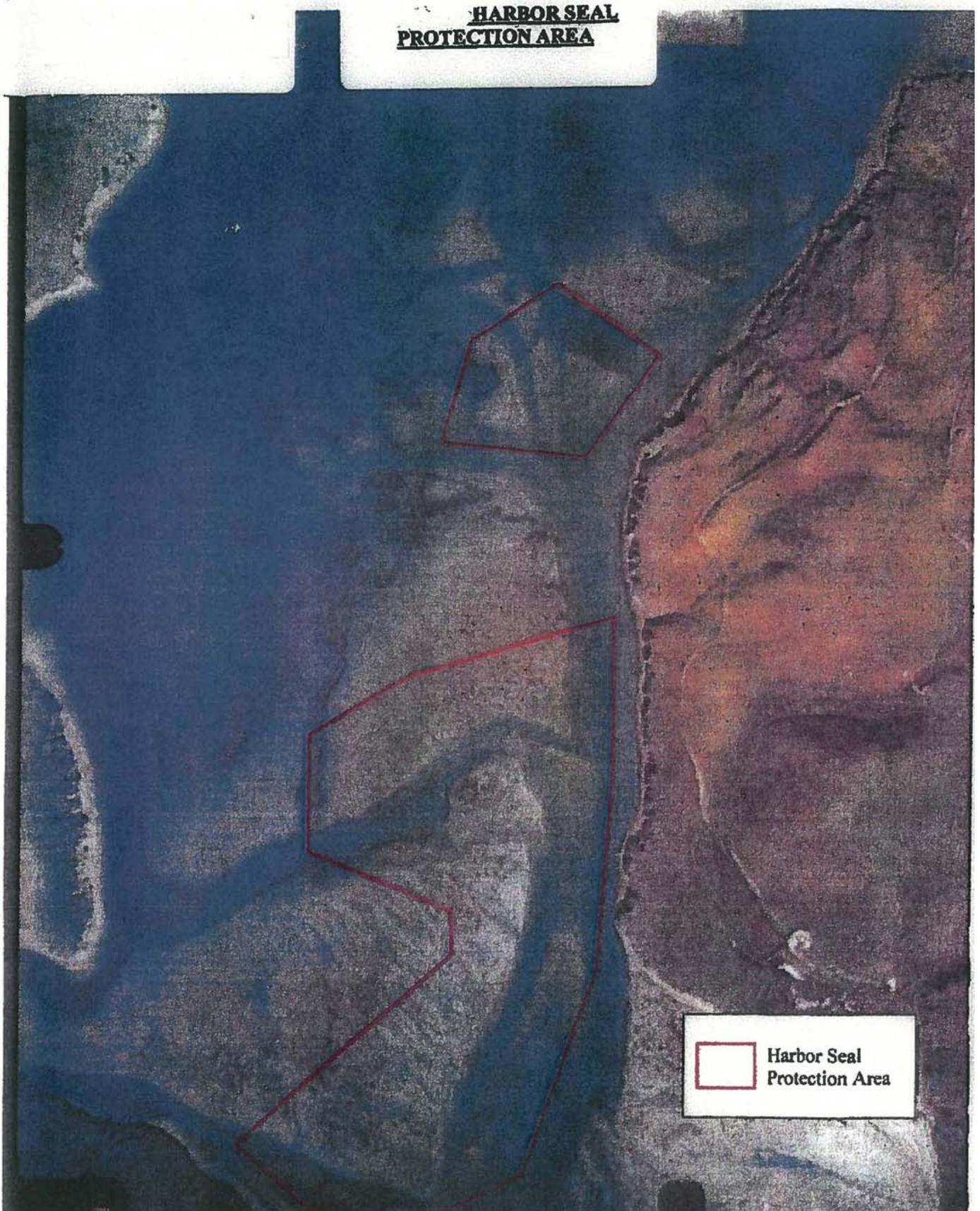


Permit Type

-  ROP - 1.5 acres
-  SUP - 1.1 acres

EXHIBIT C

Drakes Estero Aquaculture and Harbor Seal Protection Protocol



**Drakes Estero Aquaculture and
Harbor Seal Protection Protocol**

The following items are mutually agreed to for protection of harbor seals in and adjacent to the Harbor Seal Protection Areas identified in the Map, attached hereto and incorporated herein by reference ("Protocol Map"):

1. During the breeding season, March 1 through June 30, the "Main Channel" and "Lateral Channel" of Drakes Estero will be closed to boat traffic. During the remainder of the year, the Lateral Channel and Main Channel are open to boat traffic outside of the protection zone.
2. During the breeding season, Permittee boats may use the "West Channel" at low speed while maintaining a distance of at least 100 yards from hauled out seals.
3. Throughout the year, all of Permittee's boats, personnel, and any structures and materials owned or used by Permittee shall be prohibited from the harbor seal protection areas identified on the Protocol Map. In addition, all of the Permittee's boats and personnel shall be prohibited from coming within 100 yards of hauled out harbor seals.

EXHIBIT D

Map – Drakes Bay Oyster Company Well Area

PR 02-106
JOHNSON OYSTER

JS 4/14/94



Some dimensions approximate

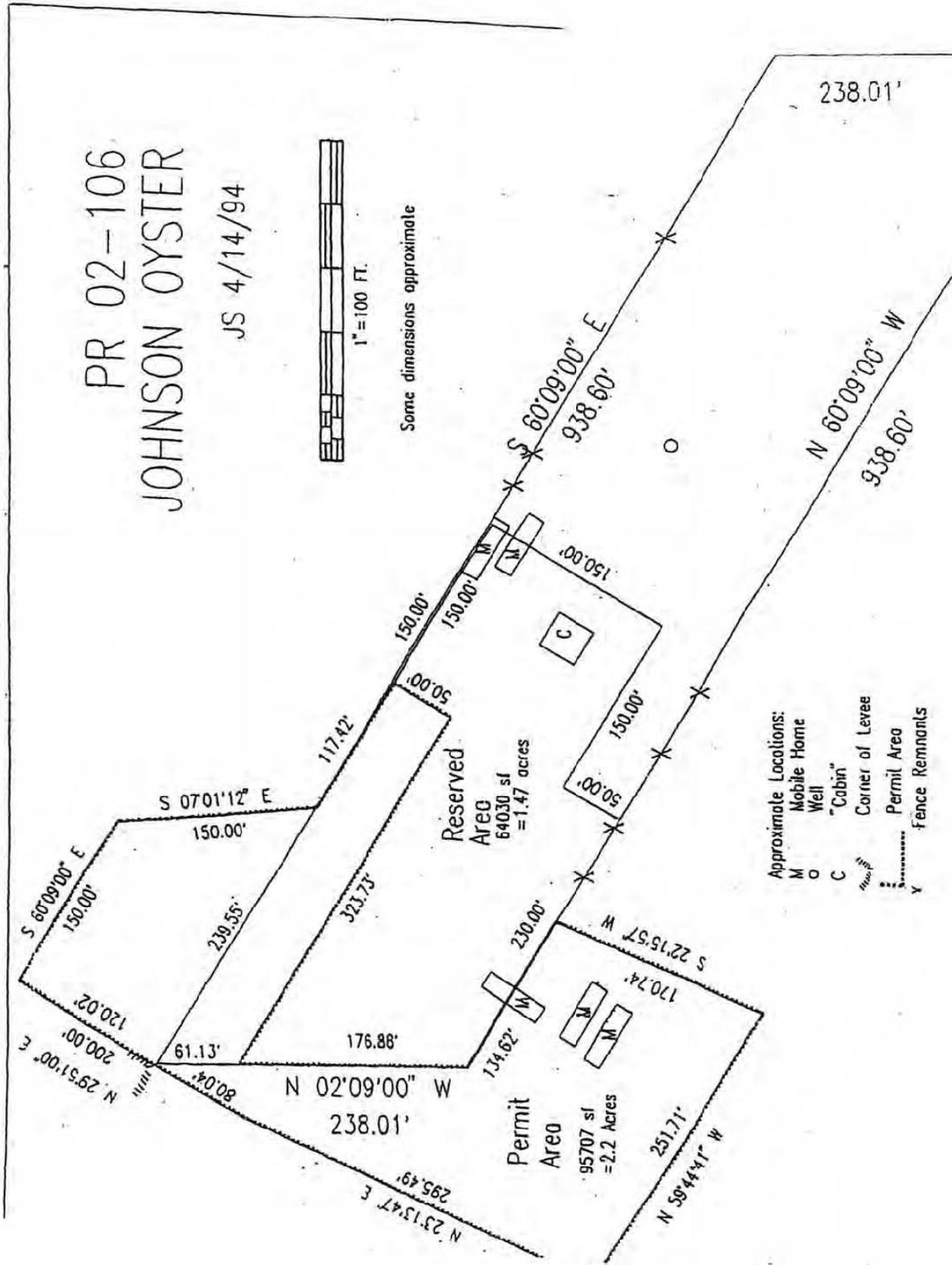
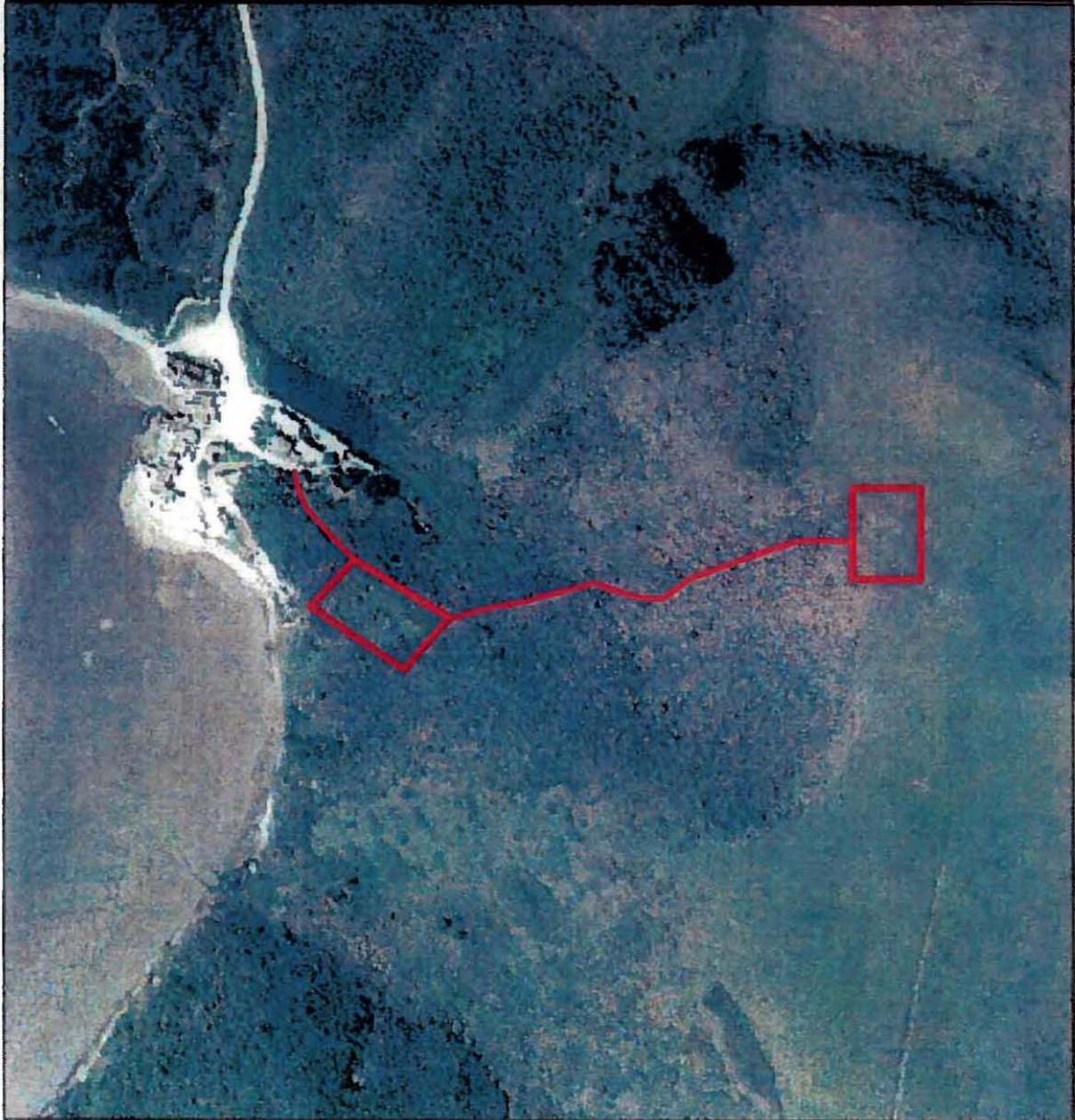


EXHIBIT E

Map – Drakes Bay Oyster Company Sewage Area

EXHIBIT

Oyster Farm Leach Field (Approximate Location and Size)

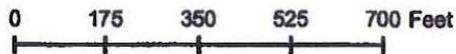


Location Map



National Park Service
Point Reyes National Seashore
Marin County, CA

 Oyster Farm Leach Field



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RESERVATION OF USE AND OCCUPANCY



United States Department of the Interior

NATIONAL PARK SERVICE
 WESTERN REGION
 450 GOLDEN GATE AVENUE, BOX 36063
 SAN FRANCISCO, CALIFORNIA 94102

IN REPLY REFER TO:

L1425(WR)ML
 PORE
 Tr. 02-106
 Johnson Oyster Co.

December 19, 1973

RECEIVED
 Point Reyes
 National Seashore

DEC 21 1973

<input checked="" type="checkbox"/>	SUPT.
<input checked="" type="checkbox"/>	ADM. OFF.
<input type="checkbox"/>	MAINTENANCE
<input type="checkbox"/>	INTERPRETATION
<input type="checkbox"/>	RES. BIOLOGIST
<input type="checkbox"/>	PROTECTION
<input type="checkbox"/>	HORSE FARM
<input type="checkbox"/>	SAFETY
<input checked="" type="checkbox"/>	FILES

Memorandum

To: Associate Director, Park System Management
 From: Regional Director, Western Region
 Subject: Transmittal of Deed Assembly

Vendor: Johnson Oyster Company
 Tract No.: 02-106
 Area: Point Reyes National Seashore
 Deed No.:

The original documents for the subject acquisition are transmitted herewith as follows:

- (x) 1. Recorded Instrument of Conveyance
 - (x) 2. Attorney General's Final Title Opinion
 - (x) 3. Title Evidence
 - () 4. Administrative Waiver Certificate
 - (x) 5. Certificate of Inspection and Possession
 - () 6. Articles of Incorporation
 - () 7. Resolution
 - (x) 8. Other Documents
- Vendor's (Seller's) Certificate of Possession (1)
Tenant's Certificate of Possession (6)
Disclaimers (6)
Terms of reservation contained in contract no. CX800032073

(Sgd) Howard H. Chapman

Enclosures

cc: Superintendent, Point Reyes, NS,
 w/cy Deed and Final Title Opinion

RECORDED AT REQUEST OF
MARIN TITLE GUARANTY CO.

97555 C

16827

After recording, return to:
NATIONAL PARK SERVICE
WESTERN REGION, DIVISION OF LANDS
450 Golden Gate Avenue, Box 36063
San Francisco, California 94102
AT 30 MIN. PAST 12 P. M.
NOV 3 0 1972
Official Records of Marin County, Calif.

POINT REYES NATIONAL SEASHORE
Tract 02-106

109-130-03

46827

N. J. Giacomini
FEE \$ 5.00 RECORDER

BOOK 2634 PAGE 641

GRANT DEED

JOHNSON OYSTER COMPANY, a California corporation, GRANTOR, pursuant to a Resolution of the Grantor's Board of Directors September 2, 1972, in consideration of SEVENTY NINE THOUSAND TWO HUNDRED (\$79,200.00) DOLLARS, to it in hand paid, receipt of which is hereby acknowledged, does hereby grant and convey to the UNITED STATES OF AMERICA, and its assigns, GRANTEE, the following described property located in the County of Marin, State of California:

EXHIBIT "A" attached hereto and made a part hereof

TOGETHER WITH all buildings and improvements thereon and all water rights appurtenant thereto and all and singular the tenements, hereditaments and appurtenances thereunto belonging, or in any wise appertaining and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

The land is conveyed subject to existing easements of record for public roads and highways, public utilities, railroads, ditches and canals.

The land hereinabove conveyed contains 5 acres, more or less, and is being acquired by the Department of the Interior, National Park Service.

THE GRANTOR RESERVES only the following rights and interests in the hereinabove described property: a reservation of use and occupancy for a period of forty (40) years in accordance with the terms of the Offer to Sell Real Property, assigned Contract No. CX800032073, signed by the GRANTOR on October 13, 1972, accepted on October 16, 1972, and on file with the National Park Service.

TO HAVE AND TO HOLD the same unto said UNITED STATES OF AMERICA and its assigns, forever.

THE GRANTOR further remises, releases, and forever quitclaims to the UNITED STATES OF AMERICA and its assigns, all right, title, and interest which the GRANTOR may have in the banks, beds, and waters of any streams bordering the land conveyed and also all interest in and to any alleys, roads, streets, ways, strips, gores or railroad rights-of-way abutting or adjoining the land conveyed and in any means of ingress or egress appurtenant thereto.

IN WITNESS WHEREOF, Johnson Oyster Company has caused its corporate name and seal to be hereunto affixed by its duly authorized officer, this 9th day of November, 1972.

JOHNSON OYSTER COMPANY

DOCUMENTARY TRANSFER TAX \$ none
— Computed on full value of property conveyed,
— OR Computed on full value less liens and encumbrances remaining at time of sale.
Signature of Declarant or Agent determining tax. Albert Jensen
Firm Name Marin Title Guaranty Co.

By Charles W. Johnson
Charles W. Johnson, President.
By Milton Simmons
Milton Simmons, Secretary-Treasurer

ACKNOWLEDGMENT

STATE OF California
County of San Francisco ss.



On this 9 day of November in the year 1972 before me, John M. Pohlmann, a Notary Public of said State, duly commissioned and sworn, personally appeared Charles W. Johnson & Milton T. Simmons and acknowledged to me that such corporation executed the same.
IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

My commission expires: April 18, 1976

J. M. Pohlmann
Notary Public in and for said State

BOOK 2634 PAGE

STATE OF CALIFORNIA, County of MECK

On November 9, 1972

before me, the undersigned, a Notary Public, in and for said County and State, personally appeared Charles W. Johnson and Milton Simon

known to me to be the Vice President and Secretary Treasurer of the corporation that executed the within instrument, and also known to me to be the persons who executed it on behalf of such corporation and acknowledged to me that such corporation executed the same.

J. M. Pohlmann

Notary Public



BOOK 2034 PAGE 642

Form 14

PARCEL ONE:

BEGINNING at a point which bears South 43° 25' 25" West 4667.148 feet from the most Easterly corner of that certain parcel of land conveyed by James and Margaret McClure to R.C.S. Communications, Inc. by Deed dated September 28, 1929 and recorded October 15, 1929 in Liber 185 of Official Records, at page 93, Marin County Records; and running thence South 60° 09' East 938.6 feet, South 2° 09' East 238.01 feet, North 60° 09' West 938.6 feet and North 2° 09' West 238.01 feet to the point of beginning

PARCEL TWO:

A RIGHT OF WAY for roadway purposes over a strip of land 14 feet in width, the center line of which is described as follows: BEING that certain property in the County of Marin, State of California, more particularly described as follows: BEGINNING at a point on the Northeasterly boundary line of that certain tract of land conveyed from Edward H. Heims et ux to Larry Jensen et ux, by Deed dated February 2, 1951, distant on said line South 60° 09' East 198.25 feet from the most Northerly corner of said tract; and running thence North 42° 47' West 171.66 feet, North 21° 12' West 107.84 feet, North 4° 48' West 105.70 feet, North 25° 45' East 168.34 feet, North 11° 06' East 96.79 feet, North 6° 29' West 224.11 feet, North 13° 57' West 110.34 feet, North 01° 18' West 91.41 feet, North 22° 51' East 349.15 feet, North 44° 19' East 145.39 feet, North 17° 40' East 137.40 feet, North 04° 58' East 225.42 feet, North 12° 20' East 151.12 feet, North 26° 04' East 173.97 feet, North 11° 55' East 285.05 feet, North 22° 56' East 166.80 feet, North 32° 14' East 170.88 feet, North 53° 27' East 161.26 feet, North 47° 12' East 126.93 feet, North 65° 02' East 76.43 feet, North 45° 17' East 78.38 feet, North 31° 38' East 91.54 feet, North 55° 55' East 99.86 feet and North 35° 11' East 177.94 feet to the Inverness-Pt. Reyes County Road.

EXHIBIT "A"

BOOK 2634 PAGE 643

**Office of the Attorney General****Washington, D. C. 20530**

December 12, 1973

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D. C.

My dear Mr. Secretary:

Re: File No. 33-5-2295-227
Tract No. 02-106
County Marin State California

An examination has been made of the title evidence and related papers pertaining to certain land in which interests have been acquired under authority of existing legislation. The land and estate acquired by the United States are more particularly described in the deed.

The title evidence and accompanying data disclose valid title to be vested in the United States of America subject to the rights and easements noted in Schedule A attached hereto which your Department has advised will not interfere with the proposed use of the land.

The title evidence and related papers have been retained in the files of this Department.

Sincerely yours,

Robert H. Berk

Acting Attorney General

Schedule A

File No.: 33-5-2295-227

Tract No.: 02-106

Project: Point Reyes National Seashore located in Marin
County, California

Estate Acquired: Fee simple and easement

Acreage: 5.00

Consideration: \$79,200.00

The deed to the United States of America was executed by Johnson Oyster Company, a corporation, on November 9, 1972, filed for record on November 30, 1972, and recorded in Book 2634, at page 641.

The title insurance policy was last satisfactorily certified as of November 30, 1972, by Transamerica Title Insurance Company.

The title is subject to the following:

1. Existing easements of record for public roads and highways, rights of way for railroads, pipelines, public utilities, ditches and canals.
2. Reservation by the grantors of the right to occupy the premises as set forth in the deed to the United States.

(WSC)LW 1
(May 1971)

UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service

Johnson Oyster Company
Vendor

02-106
Tract

CX800032073
Contract No.

Point Reyes
National Seashore
Area

OFFER TO SELL REAL PROPERTY

The undersigned, hereinafter called the Vendor, in consideration of the mutual covenants and agreements herein set forth, offers to sell and convey to the United States of America and its assigns, the fee simple title to the following described land, with the buildings and improvements thereon, and all rights, hereditaments, easements, and appurtenances thereunto belonging, located in the

County of Marin, State of California,

containing 5.00 acres, more or less, more particularly described as follows:

See Exhibit "A" attached hereto and made a part hereof.

(WSC)LW 1
(May 1971)

subject to existing easements for public roads and highways, public utilities, railroads and pipelines, and encumbrances listed on Exhibit "B" attached hereto and made a part hereof.

Excepting and reserving only the following rights and interests in the above described property: as shown on Exhibit "C" attached hereto and made a part hereof.

The terms and conditions of this offer are as follows:

(1) The Vendor agrees that this offer may be accepted by the United States through any duly authorized representative, by delivering, mailing, or telegraphing a notice of acceptance to the Vendor at the address stated below, at any time within three (3) month(s) from the date hereof, whereupon this offer and the acceptance thereof become a binding contract.

(2) The United States of America agrees to pay the Vendor for said land the sum of Seventy Nine Thousand Two Hundred dollars (\$ 79,200.00) payable on acceptance of this offer and approval of

(WSC)LW 1
(May 1971)

the Vendor's title; provided the Vendor can execute and deliver a good and sufficient deed conveying said land with the hereditaments and appurtenances thereunto belonging to the United States of America and its assigns, in fee simple, free and clear of all liens and encumbrances, except those specifically excepted or reserved above, together with all right, title, and interest of the Vendor in and to any streams, alleys, roads, streets, ways, strips, gores, or railroad rights-of-way abutting or adjoining said land.

(3) It is agreed that the United States will defray the expenses incident to the preparation and recordation of the deed to the United States and the procurement of the necessary title evidence.

(4) The Vendor agrees that all taxes, assessments, and encumbrances which are a lien against the land at the time of conveyance to the United States shall be satisfied of record by the Vendor at or before the transfer of title and, if the Vendor fails to do so, the United States may pay any taxes, assessments, and encumbrances which are a lien against the land; that the amount of any such payments by the United States shall be deducted from the purchase price of the land; that the Vendor will, at the request of the United States and without prior payment or tender of the purchase price, execute and deliver the deed to the United States, pay any applicable documentary revenue stamp tax or excise tax, and obtain and record such other curative evidence of title as may be required by the United States.

As soon as possible after the date of payment of the purchase price of this offer or the date of deposit in court of the funds to satisfy the award of compensations in a condemnation proceeding to acquire the real property herein described, whichever is the earliest, the United States hereby agrees to reimburse the Vendor in an amount deemed by the United States to be fair and reasonable for the following expenses incurred by the Vendor in completing this transaction:

- (a) Recording fees, transfer taxes and similar expenses incidental to conveying the real property described herein to the United States.
- (b) Penalty cost for prepayment of any pre-existing recorded mortgage entered into in good faith encumbering said real property; and
- (c) The pro rata portion of real property taxes paid which are allocable to a period subsequent to the date of vesting title in the United States, or the effective date of possession of such real property by the United States, whichever is earlier. The

(WSC)LW 1
(April 71)

Vendor agrees to furnish the United States evidence that these items of expenses have been billed to and paid by him, and further agrees that the United States alone shall determine the fairness and reasonableness of the expenses to be paid.

(5) The Vendor agrees that loss or damage to the property by fire or acts of God shall be at the risk of the Vendor until the title to the land and deed to the United States have been accepted by the United States through its duly authorized representative; and, in the event that such loss or damage occurs, the United States may, without liability, refuse to accept the conveyance of the title or it may elect to accept conveyance of title to such property, in which case there shall be an equitable adjustment of the purchase price.

(6) The Vendor agrees that the United States may acquire title to said land by condemnation or other judicial proceedings, in which event the Vendor agrees to cooperate with the United States in the prosecution of such proceedings; agrees that the consideration hereinabove stated shall be the full amount of the award of just compensation, inclusive of interest, for the taking of said land; agrees that any and all awards of just compensation that may be made in the proceeding to any defendant shall be payable and deductible from said amount.

(7) The Vendor further agrees that from the date hereof, officers and accredited agents of the United States shall have, at all proper times, rights and privileges to survey and enter upon said property for all lawful purposes in connection with the acquisition thereof.

(8) It is agreed that the spouse, if any, of the Vendor, by signing below, agrees to join in any deed to the United States and to execute any instrument deemed necessary to convey to the United States any separate or community estate or interest in the subject property and to relinquish and release any dower, curtesy, homestead, or other rights or interests of such spouse therein.

(9) The Vendor represents and it is a condition of acceptance of this offer that no member of or delegate to Congress, or resident commissioner, shall be admitted to or share any part of this agreement, or to any benefits that may arise therefrom; but this provision shall not be construed to extend to any agreement if made with a corporation for its general benefit.

(10) The terms and conditions aforesaid are to apply to and bind the heirs, executors, administrators, successors, and assigns of the Vendor.

(WSC)LW 1
(April 71)

(11) All terms and conditions with respect to this offer are expressly contained herein and the Vendor agrees that no representative or agent of the United States has made any representation or promise with respect to this offer not expressly contained herein.

(12) The Vendor hereby authorizes and directs the United States to accomplish payment of the amount specified in paragraph 2 above by depositing a check in said amount payable to the Marin Title Guaranty Company, escrow agent for the Vendor, 1300 Fourth Street San Rafael, California.

Signed and Delivered this 12th day of October, 1972.

WITNESSES:

VENDORS: Johnson Oyster Company

Witness

Charles W. Johnson
Vendor

Charles W. Johnson, President

Witness

Milton Simmons
Vendor

Milton Simmons, Secretary-Treasurer

Witness

Vendor

Witness

Vendor

Notice of acceptance of this offer is to be sent to:

Mr. Charles W. Johnson, P. O. Box 68, Inverness, California 94937
Name Address City, State, ZIP

ACCEPTANCE OF OFFER TO SELL REAL PROPERTY

The offer of the Vendor contained herein is hereby accepted for and on behalf of the UNITED STATES OF AMERICA.

Date: 10/16/72

By: [Signature]

Title: CHIEF, DIVISION OF LANDS
WESTERN REGION

Exhibit "A"

That certain real property situate in the County of Marin, State of California, described as follows:

PARCEL ONE:

BEGINNING at a point which bears South 43° 25' 25" West 4667.148 feet from the most Easterly corner of that certain parcel of land conveyed by James and Margaret McClure to R.C.S. Communications, Inc. by Deed dated September 28, 1929 and recorded October 15, 1929 in Liber 185 of Official Records, at page 93, Marin County Records; and running thence South 60° 09' East 938.6 feet, South 2° 09' East 238.01 feet, North 60° 09' West 938.6 feet and North 2° 09' West 238.01 feet to the point of beginning

PARCEL TWO:

A RIGHT OF WAY for roadway purposes over a strip of land 14 feet in width, the center line of which is described as follows: BEING that certain property in the County of Marin, State of California, more particularly described as follows: BEGINNING at a point on the Northeasterly boundary line of that certain tract of land conveyed from Edward H. Heins et ux to Larry Jensen et ux, by Deed dated February 2, 1951, distant on said line South 60° 09' East 198.25 feet from the most Northerly corner of said tract; and running thence North 42° 47' West 171.66 feet, North 21° 12' West 107.84 feet, North 4° 48' West 105.70 feet, North 25° 45' East 168.34 feet, North 11° 06' East 96.79 feet, North 6° 29' West 224.11 feet, North 13° 57' West 110.34 feet, North 01° 18' West 91.41 feet, North 22° 51' East 349.15 feet, North 44° 19' East 145.39 feet, North 17° 40' East 137.40 feet, North 04° 58' East 225.42 feet, North 12° 20' East 151.12 feet, North 26° 04' East 173.97 feet, North 11° 55' East 285.05 feet, North 22° 56' East 166.80 feet, North 32° 14' East 170.88 feet, North 53° 27' East 161.26 feet, North 47° 12' East 126.93 feet, North 65° 02' East 76.43 feet, North 45° 17' East 78.38 feet, North 31° 38' East 91.54 feet, North 55° 55' East 99.86 feet and North 35° 11' East 177.94 feet to the Inverness-Pt. Reyes County Road.

Exhibit "B"

1. Any adverse claim based upon the assertion that some portion of said land is tide or submerged lands, or has been created by artificial means or has accreted to such portions so created.
2. No insurance will be undertaken as to any portion of the herein described property that lies below the line of ordinary high tide as it came to rest from natural means.
3. Conditions regarding the use of Parcel Two herein as contained in an Agreement between Edward H. Heims, et ux and A. L. Jensen, et ux, recorded February 5, 1951, in Book 676 of Official Records at page 382.

The interest of the Heims now vests in the United States of America.

EXHIBIT "C"

Reserving to Vendor, its successors and assigns, a terminable right to use and occupy the above-described property, as delineated on Exhibit "D", attached, together with the improvements situated thereon, for a period of 40 years for the purpose of processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation to the visiting public, and residential purposes reasonably incidental thereto, subject to the following:

Definitions

The term "Director" as used herein means the Director of the National Park Service; and includes all his duly authorized, delegated representatives.

The term "Vendor" as used herein means the Johnson Oyster Company, a California Corporation, and its successors and assigns.

1. The premises reserved by Vendor hereunder shall at all times be maintained in a safe, sanitary, and sightly condition, open to reasonable inspection by the Director, and meeting all Federal, State, and County health, sanitation, and safety standards applicable to operation of and residence within areas engaged in the processing and retail sale of oysters.

2. Utility services related to the reserved premises, including but not limited to water, electricity, sanitation, and garbage disposal are the sole responsibility of Vendor. Garbage and debris shall be disposed of by Vendor outside the boundary of the Point Reyes National Seashore. Use of the existing trash and garbage dumps on the reserved premises shall be discontinued and the dumps shall be restored to a natural condition by Vendor.

3. Oyster shells may be disposed of within the boundaries of the Point Reyes National Seashore and may be stockpiled for a reasonable period of time on the premises for use as follows:

- a) Upon approval and under an agreement with the Fish and Game Department and other State of California regulatory authorities, some shells may be ground up and deposited uniformly on the water bottom allotments.
- b) Some shells may be used for surfacing the road southerly from Sir Francis Drake Highway to the premises including the parking area on the reserved premises and the parking area on the adjacent land under special use by the Vendor. Approval of the Superintendent will be required prior to deposition of shells anywhere else within the Seashore for road surfacing purposes.
- c) Some shells may be used for seed purpose in oyster propagation.

d) Some shells will be maintained to offer as gifts to the visiting public.

4. Vendor shall not commit waste upon the reserved premises and shall at all times maintain them in a neat and sightly condition.

5. A permanent residence shall be maintained upon the reserved property, occupied by a responsible employee of Vendor.

6. Vendor shall abide by all rules and regulations pertaining to National Park System areas.

7. No permanent or temporary structure, sign or other improvement of any type whatsoever shall be erected by Vendor in or upon the reserved premises or improvements without the prior written approval of the Director.

8. Vendor and its employees shall take all reasonable precautions to prevent fires in and about the reserved premises, and shall cooperate with the Director in fire extinguishment in the reserved premises and areas immediately adjacent to the reserved premises.

9. During the term of Vendor's reservation, Vendor shall be solely responsible for all claims arising from use of the reserved premises by visitors, and shall carry extended coverage liability insurance protecting against such claims in an amount and of a type agreed by the Director, to be sufficient for this purpose.

10. During the term of occupancy, the Vendor shall carry fire and extended coverage insurance to the full insurable value of the improvements. The insured under said fire and extended coverage insurance shall be the Vendor and the United States of America as their interests may appear. In case of loss, the Vendor may replace the improvements with equivalent structures. Should the Vendor elect not to rebuild, all insurance proceeds shall be divided between the United States and the Vendor as their interests may appear.

11. Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property for the herein described purposes, provided however, that such permit will run concurrently with and will terminate upon the expiration of State water bottom allotments assigned to the Vendor. Any permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires.

12. Upon expiration of Vendor's reservation, or the extended use period by permit, it shall remove all structures and improvements placed upon the premises during the period of its reservation. Any such property not removed from the reserved premises within 90 days after expiration of Vendor's reservation shall be presumed to have been abandoned and shall be

presumed to have been abandoned and shall become the property of the United States of America, but this shall in no way relieve Vendor of liability for the cost of removal of such property from the reserved premises.

13. Disputes concerning performance under the terms of this reservation shall be determined by the Secretary of the Interior or his duly authorized representative in a manner consistent with due process of law.

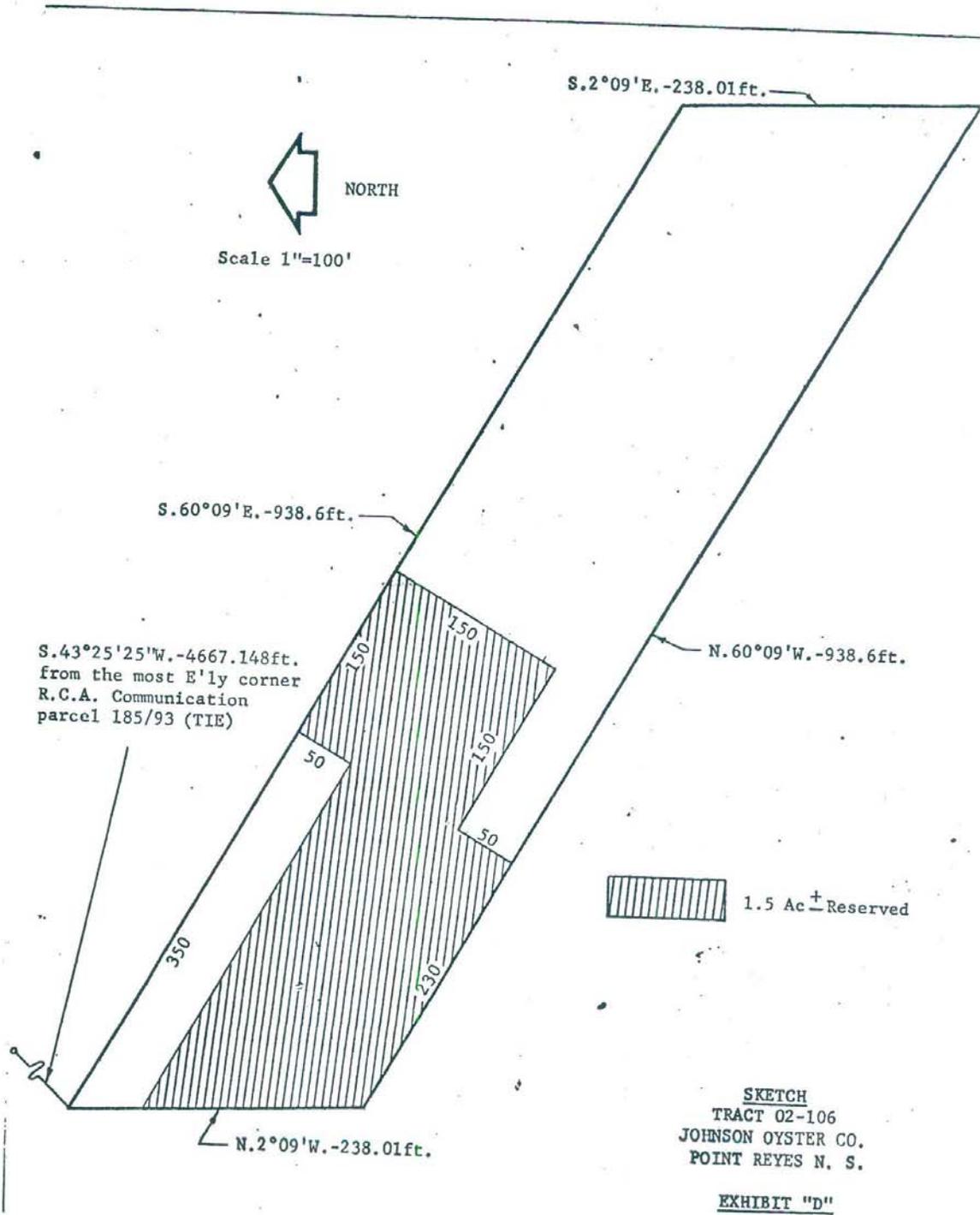
14. Should Vendor elect to dispose of any unused portion of the remainder of its reserved occupancy, the United States of America shall be afforded a right of first refusal to acquire the same.

15. A special use permit will be issued by the Director to Vendor for public interpretation of oyster cultivation by Vendor or adjacent premises, effective concurrently with Vendor's reservation.

16. Vendor shall keep the reserved premises open to the public for the interpretation of oyster cultivation and processing.

17. Vendor, its successors and assigns, shall pay the possessory interest tax during the term of use and occupancy.

18. Vendor cannot conduct a restaurant operation on the premises without prior written approval of the Director.



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B

RELEVANT LEGISLATION

- Section 124 of PL 111-88
- Point Reyes National Seashore Enabling Legislation
- State Land Grant, Assembly Bill No. 1024, Chapter 983, July 9, 1965
- PL 94-567
- PL 94-544
- PL 88-577
- PL 99-68
- Federal Register Vol. 64, No. 222 11/18/1999, Notices: Public Law 94-567 Notice of Designation of Potential Wilderness as Wilderness, PORE

GOLDEN GATE NATIONAL RECREATION AREA, FORT BAKER
AMENDMENT

SEC. 123. Section 120 of title I of H.R. 3423 (Appendix C) as enacted into law by section 1000(a)(3) of division B of Public Law 106–113 is amended by striking the last sentence.

16 USC 460bb–3
note.

POINT REYES NATIONAL SEASHORE, EXTENSION OF PERMIT

Time period.

Deadline.
Payments.

SEC. 124. Prior to the expiration on November 30, 2012 of the Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit ("existing authorization") within Drake's Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012: *Provided*, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. Nothing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore.

NATIONAL PARK SYSTEM, SPECIAL RESOURCE STUDY

SEC. 125. (a) IN GENERAL.—The Secretary of the Interior (referred to in this section as the "Secretary") shall conduct a special resource study of the national significance, suitability, and feasibility of including the Honouliuli Gulch and associated sites within the State of Hawaii in the National Park System.

(b) GUIDELINES.—In conducting the study, the Secretary shall use the criteria for the study of areas for potential inclusion in the National Park System described in section 8 of Public Law 91–383 (16 U.S.C. 1a–5).

(c) CONSULTATION.—In conducting the study, the Secretary shall consult with—

- (1) the State of Hawaii;
- (2) appropriate Federal agencies;
- (3) Native Hawaiian and local government entities;
- (4) private and nonprofit organizations;
- (5) private land owners; and
- (6) other interested parties.

(d) THEMES.—The study shall evaluate the Honouliuli Gulch, associated sites located on Oahu, and other islands located in the State of Hawaii with respect to—

- (1) the significance of the site as a component of World War II;
- (2) the significance of the site as the site related to the forcible internment of Japanese Americans, European Americans, and other individuals; and
- (3) historic resources at the site.

16 USC Sec. 459c

01/22/02

TITLE 16 - CONSERVATION
CHAPTER 1 - NATIONAL PARKS, MILITARY PARKS, MONUMENTS, AND
SEASHORES
SUBCHAPTER LXIII - NATIONAL SEASHORE RECREATIONAL AREAS

Sec. 459c. Point Reyes National Seashore; purposes; authorization for establishment

-STATUTE-

In order to save and preserve, for purposes of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped, the Secretary of the Interior (hereinafter referred to as the "Secretary") is authorized to take appropriate action in the public interest toward the establishment of the national seashore set forth in section 459c-1 of this title.

-SOURCE-

(Pub. L. 87-657, Sec. 1, Sept. 13, 1962, 76 Stat. 538.)

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-5, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-1. Description of area

-STATUTE-

(a) Boundary map; availability; publication in Federal Register

The Point Reyes National Seashore shall consist of the lands, waters, and submerged lands generally depicted on the map entitled "Boundary Map, Point Reyes National Seashore", numbered 612-80,008-E and dated May 1978, plus those areas depicted on the map entitled "Point Reyes and GGNRA Amendments, dated October 25, 1979".

The map referred to in this section shall be on file and available for public inspection in the Offices of the National Park Service, Department of the Interior, Washington, District of Columbia. After advising the Committee on Natural Resources of the United States House of Representatives and the Committee on Energy and Natural Resources of the United States Senate in writing, the Secretary may make minor revisions of the boundaries of the Point Reyes National Seashore when necessary by publication of a revised drawing or other boundary description in the Federal Register.

(b) Bear Valley Ranch right-of-way

The area referred to in subsection (a) of this section shall also include a right-of-way to the aforesaid tract in the general vicinity of the northwesterly portion of the property known as "Bear Valley Ranch", to be selected by the Secretary, of not more than four hundred feet in width, together with such adjoining lands as would be deprived of access by reason of the acquisition of such right-of-way.

-SOURCE-

(Pub. L. 87-657, Sec. 2, Sept. 13, 1962, 76 Stat. 538; Pub. L. 89-666, Sec. 1(a), Oct. 15, 1966, 80 Stat. 919; Pub. L. 93-550, title II, Sec. 201, Dec. 26, 1974, 88 Stat. 1744; Pub. L. 95-625, title III, Sec. 318(a), Nov. 10, 1978, 92 Stat. 3486; Pub. L. 96-199, title I, Sec. 101(a)(1), Mar. 5, 1980, 94 Stat. 67; Pub. L. 103-437, Sec. 6(d)(16), Nov. 2, 1994, 108 Stat. 4584.)

AMENDMENTS

1994 - Subsec. (a). Pub. L. 103-437 substituted "Natural Resources" for "Interior and Insular Affairs" after "Committee on".

1980 - Subsec. (a). Pub. L. 96-199 inserted ", plus those areas depicted on the map entitled 'Point Reyes and GGNRA Amendments, dated October 25, 1979' " after "dated May 1978".

1978 - Subsec. (a). Pub. L. 95-625 substituted as a description of the area the lands generally depicted on Boundary Map numbered 612-80,008-E and dated May 1978 for prior such depiction on Boundary Map numbered 612-80,008-B, and dated August 1974; included submerged lands in the description; made the map specifically available in the Washington, District of Columbia, Office; and authorized minor revisions of boundaries and publication thereof in the Federal Register after advising Congressional committees.

1974 - Subsec. (a). Pub. L. 93-550 substituted as a boundary description Boundary Map No. 612-80,008-B, and dated August 1974, on file in the office of the National Park Service, Department of the Interior, for a boundary map designated NS-PR-7001, dated June 1, 1960, on file with the Director of the National Park Service, Washington, D.C., and all measurements relating thereto.

1966 - Subsec. (b). Pub. L. 89-666 inserted "to the aforesaid tract in the general vicinity of the northwesterly portion of the property known as 'Bear Valley Ranch' " after "right-of-way", struck out "from the intersection of Sir Francis Drake Boulevard and Haggerty Gulch" after "aforesaid tract" and included such adjoining lands as would be deprived of access by reason of the right-of-way.

CHANGE OF NAME

Committee on Natural Resources of House of Representatives treated as referring to Committee on Resources of House of Representatives by section 1(a) of Pub. L. 104-14, set out as a note preceding section 21 of Title 2, The Congress.

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c, 459c-2, 459c-4, 459c-5, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-2. Acquisition of property

-STATUTE-

- (a) Authority of Secretary; manner and place; concurrence of State owner; transfer from Federal agency to administrative jurisdiction of Secretary; liability of United States under contracts contingent on appropriations

The Secretary is authorized to acquire, and it is the intent of Congress that he shall acquire as rapidly as appropriated funds become available for this purpose or as such acquisition can be accomplished by donation or with donated funds or by transfer, exchange, or otherwise the lands, waters, and other property, and improvements thereon and any interest therein, within the areas described in section 459c-1 of this title or which lie within the boundaries of the seashore as established under section 459c-4 of this title (hereinafter referred to as "such area"). Any property, or interest therein, owned by a State or political subdivision thereof may be acquired only with the concurrence of such owner. Notwithstanding any other provision of law, any Federal property located within such area may, with the concurrence of the agency having custody thereof, be transferred without consideration to the administrative jurisdiction of the Secretary for use by him in carrying out the provisions of sections 459c to 459c-7 of this title. In exercising his authority to acquire property in accordance with the provisions of this subsection, the Secretary may enter into contracts requiring the expenditure, when appropriated, of funds authorized by section 459c-7 of this title, but the liability of the United States under any such contract shall be contingent on the appropriation of funds sufficient to fulfill the obligations thereby incurred.

- (b) Payment for acquisition; fair market value

The Secretary is authorized to pay for any acquisitions which he makes by purchase under sections 459c to 459c-7 of this title their fair market value, as determined by the Secretary, who may in his discretion base his determination on an independent appraisal obtained by him.

- (c) Exchange of property; cash equalization payments

In exercising his authority to acquire property by exchange, the Secretary may accept title to any non-Federal property located within such area and convey to the grantor of such property any federally owned property under the jurisdiction of the Secretary within California and adjacent States, notwithstanding any other provision of law. The properties so exchanged shall be approximately equal in fair market value, provided that the Secretary may accept cash from or pay cash to the grantor in such an exchange in order to equalize the values of the properties exchanged.

-SOURCE-

(Pub. L. 87-657, Sec. 3, Sept. 13, 1962, 76 Stat. 539; Pub. L. 91-223, Sec. 2(a), Apr. 3, 1970, 84 Stat. 90.)

AMENDMENTS

1970 - Pub. L. 91-223 substituted introductory "The" for "Except as provided in section 459c-3 of this title, the".

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-4, 459c-5, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-3. Repealed. Pub. L. 91-223, Sec. 2(b), Apr. 3, 1970, 84 Stat. 90

Section, Pub. L. 87-657, Sec. 4, Sept. 13, 1962, 76 Stat. 540, provided conditions for exercise of eminent domain within pastoral zone and defined "ranching and dairying purposes".

Sec. 459c-4. Point Reyes National Seashore

-STATUTE-

(a) Establishment; notice in Federal Register

As soon as practicable after September 13, 1962, and following the acquisition by the Secretary of an acreage in the area described in section 459c-1 of this title, that is in the opinion of the Secretary efficiently administrable to carry out the purposes of sections 459c to 459c-7 of this title, the Secretary shall establish Point Reyes National Seashore by the publication of notice thereof in the Federal Register.

(b) Distribution of notice and map

Such notice referred to in subsection (a) of this section shall contain a detailed description of the boundaries of the seashore which shall encompass an area as nearly as practicable identical to the area described in section 459c-1 of this title. The Secretary shall forthwith after the date of publication of such notice in the Federal Register (1) send a copy of such notice, together with a map showing such boundaries, by registered or certified mail to the Governor of the State and to the governing body of each of the political subdivisions involved; (2) cause a copy of such notice and map to be published in one or more newspapers which circulate in each of the localities; and (3) cause a certified copy of such notice, a copy of such map, and a copy of sections 459c to 459c-7 of this title to be recorded at the registry of deeds for the county involved.

-SOURCE-

(Pub. L. 87-657, Sec. 4, formerly Sec. 5, Sept. 13, 1962, 76 Stat. 540; renumbered Sec. 4, Pub. L. 91-223, Sec. 2(c), Apr. 3, 1970, 84 Stat. 90.)

AMENDED DESCRIPTION OF BOUNDARIES OF POINT REYES NATIONAL SEASHORE;

PUBLICATION IN FEDERAL REGISTER

Pub. L. 93-550, title II, Sec. 202, Dec. 26, 1974, 88 Stat. 1744, provided that: "The Secretary of the Interior shall, as soon as practicable after the date of enactment of this title (Dec. 26, 1974), publish an amended description of the boundaries of the Point Reyes National Seashore in the Federal Register, and thereafter he shall take such action with regard to such amended description and the map referred to in section 201 of this title (amending section 459c-1 of this title) as is required in the second sentence of subsection (b) of section 4 of the act of September 13, 1962, as amended (subsec. (b) of this section)."

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-5, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-5. Owner's reservation of right of use and occupancy for fixed term of years or life

-STATUTE-

- (a) Election of term; fair market value; termination; notification; lease of Federal lands; restrictive covenants, offer to prior owner or leaseholder

Except for property which the Secretary specifically determines is needed for interpretive or resources management purposes of the seashore, the owner of improved property or of agricultural property on the date of its acquisition by the Secretary under sections 459c to 459c-7 of this title may, as a condition of such acquisition, retain for himself and his or her heirs and assigns a right of use and occupancy for a definite term of not more than twenty-five years, or, in lieu thereof, for a term ending at the death of the owner or the death of his or her spouse, whichever is later. The owner shall elect the term to be reserved. Unless the property is wholly or partly donated to the United States, the Secretary shall pay to the owner the fair market value of the property on the date of acquisition minus the fair market value on that date of the right retained by the owner. A right retained pursuant to this section shall be subject to termination by the Secretary upon his or her determination that it is being exercised in a manner inconsistent with the purposes of sections 459c to 459c-7 of this title, and it shall terminate by operation of law upon the Secretary's notifying the holder of the right of such determination and tendering to him or her an amount equal to the fair market value of that portion of the right which remains unexpired. Where appropriate in the discretion of the Secretary, he or she may lease federally owned land (or any interest therein) which has been acquired by the Secretary under sections 459c to 459c-7 of this title, and which was agricultural land prior to its acquisition. Such lease shall be subject to such restrictive covenants as may be necessary to carry out the purposes of sections 459c to 459c-7 of this title. Any land to be leased by the Secretary under this section shall be offered first for such lease to the person who owned such land or was a leaseholder thereon immediately before its acquisition by the United States.

- (b) "Improved and agricultural property" defined

As used in sections 459c to 459c-7 of this title, the term "improved property" shall mean a private noncommercial dwelling, including the land on which it is situated, whose construction was begun before September 1, 1959, or, in the case of areas added by action of the Ninety-fifth Congress, May 1, 1978 or, in the case of areas added by action of the Ninety-sixth Congress, May 1, 1979, and structures accessory thereto (hereinafter in this subsection referred to as "dwelling"), together with such amount and locus of the property adjoining and in the same ownership as such dwelling as the Secretary designates to be reasonably necessary for the enjoyment of such dwelling for the sole purpose of noncommercial residential use and occupancy. In making such designation the Secretary shall take into account the manner of noncommercial residential use and occupancy in which the dwelling and such adjoining property has usually been enjoyed by its owner or occupant. The term "agricultural property" as used in sections 459c to 459c-7 of this title means lands which were in regular use for, or were being converted to agricultural, ranching, or dairying purposes as of May 1, 1978 or, in the case of areas added by action of the Ninety-sixth Congress, May 1, 1979, together with residential and other structures related to the above uses of the property that were in existence or under construction as of May 1, 1978.

- (c) Payment deferral; scheduling; interest rate

In acquiring those lands authorized by the Ninety-fifth Congress for the purposes of sections 459c to 459c-7 of this title, the Secretary may, when agreed upon by the landowner involved, defer payment or schedule payments over a period of ten years and pay interest on the unpaid balance at a rate not exceeding that paid by the Treasury of the United States for borrowing purposes.

(d) Lands donated by State of California

The Secretary is authorized to accept and manage in accordance with sections 459c to 459c-7 of this title, any lands and improvements within or adjacent to the seashore which are donated by the State of California or its political subdivisions. He is directed to accept any such lands offered for donation which comprise the Tomales Bay State Park, or lie between said park and Fish Hatchery Creek. The boundaries of the seashore shall be changed to include any such donated lands.

(e) Fee or admission charge prohibited

Notwithstanding any other provision of law, no fee or admission charge may be levied for admission of the general public to the seashore.

-SOURCE-

(Pub. L. 87-657, Sec. 5, formerly Sec. 6, Sept. 13, 1962, 76 Stat. 541; renumbered Sec. 5, Pub. L. 91-223, Sec. 2(c), Apr. 3, 1970, 84 Stat. 90; amended Pub. L. 95-625, title III, Sec. 318(b)-(d), Nov. 10, 1978, 92 Stat. 3487; Pub. L. 96-199, title I, Sec. 101(a)(2)-(4), Mar. 5, 1980, 94 Stat. 67.)

AMENDMENTS

1980 - Subsec. (a). Pub. L. 96-199, Sec. 101(a)(2), substituted "Except for property which the Secretary specifically determines is needed for interpretive or resources management purposes of the seashore, the" for "The" in first sentence.

Subsec. (b). Pub. L. 96-199, Sec. 101(a)(3), inserted "or, in the case of areas inserted by action of the Ninety-sixth Congress, May 1, 1979," after "May 1, 1978" and "that were in existence or under construction as of May 1, 1978" after "related to the above uses of the property".

Subsecs. (d), (e). Pub. L. 96-199, Sec. 101(a)(4), added subsecs. (d) and (e).

1978 - Subsec. (a). Pub. L. 95-625, Sec. 318(b), extended provision to agricultural property; provided for: retention rights of heirs and assigns, retention rights for term of twenty-five years or for term ending with death of owner or spouse, whichever was later, as elected by owner, which provision previously authorized retention for term of fifty years, termination of right of retention and notice thereof, and for lease of federally owned lands, subject to restrictive covenants, with first offer to prior owner or leaseholder; and included clause relating to donation of property to the United States.

Subsec. (b). Pub. L. 95-625, Sec. 318(c), defined "improved property" to include private dwelling, the construction of which was begun, in the case of areas added by action of the Ninety-fifth Congress, October 1, 1978, and included definition of "agricultural property".

Subsec. (c). Pub. L. 95-625, Sec. 318(d), added subsec. (c).

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-6. Administration of property

-STATUTE-

(a) Protection, restoration, and preservation of natural environment

Except as otherwise provided in sections 459c to 459c-7 of this title, the property acquired by the Secretary under such sections shall be administered by the Secretary without impairment of its natural values, in a manner which provides for such recreational, educational, historic preservation, interpretation, and scientific research opportunities as are consistent with, based upon, and supportive of the maximum protection, restoration, and preservation of the natural environment within the area, subject to the provisions of sections 1, 2, 3, and 4 of this title, as amended and supplemented, and in accordance with other laws of general application relating to the national park system as defined by sections 1b to 1d of this title, except that authority otherwise available to the Secretary for the conservation and management of natural resources may be utilized to the extent he finds such authority will further the purposes of sections 459c to 459c-7 of this title.

(b) Hunting and fishing regulations

The Secretary may permit hunting and fishing on lands and waters under his jurisdiction within the seashore in such areas and under such regulations as he may prescribe during open seasons prescribed by applicable local, State, and Federal law. The Secretary shall consult with officials of the State of California and any political subdivision thereof who have jurisdiction of hunting and fishing prior to the issuance of any such regulations, and the Secretary is authorized to enter into cooperative agreements with such officials regarding such hunting and fishing as he may deem desirable.

-SOURCE-

(Pub. L. 87-657, Sec. 6, formerly Sec. 7, Sept. 13, 1962, 76 Stat. 541; renumbered Sec. 6, Pub. L. 91-223, Sec. 2(c), Apr. 3, 1970, 84 Stat. 90; amended Pub. L. 94-544, Sec. 4(a), Oct. 18, 1976, 90 Stat. 2515; Pub. L. 94-567, Sec. 7(a), Oct. 20, 1976, 90 Stat. 2695.)

AMENDMENTS

1976 - Subsec. (a). Pub. L. 94-544 and Pub. L. 94-567 made substantially identical amendments by inserting provision which directed the Secretary to administer the property acquired in such a manner so as to provide recreational, educational, historic preservation, interpretation, and scientific research opportunities consistent with the maximum protection, restoration, and preservation of the environment.

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-5, 459c-6b, 459c-7 of this title.

Sec. 459c-6a. The Clem Miller Environmental Education Center; designation

-STATUTE-

The Secretary shall designate the principal environmental education center within the seashore as "The Clem Miller Environmental Education Center", in commemoration of the

vision and leadership which the late Representative Clem Miller gave to the creation and protection of Point Reyes National Seashore.

-SOURCE-

(Pub. L. 87-657, Sec. 7, as added Pub. L. 94-544, Sec. 4(b), Oct. 18, 1976, 90 Stat. 2515, and Pub. L. 94-567, Sec. 7(b), Oct. 20, 1976, 90 Stat. 2695.)

CODIFICATION

Section 7(b) of Pub. L. 94-567 enacted this section as did section 4(b) of Pub. L. 94-544.

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-5, 459c-6, 459c-6b, 459c-7 of this title.

Sec. 459c-6b. Cooperation with utilities district; land use and occupancy; terms and conditions

-STATUTE-

The Secretary shall cooperate with the Bolinas Public Utilities District to protect and enhance the watershed values within the seashore. The Secretary may, at his or her discretion, permit the use and occupancy of lands added to the seashore by action of the Ninety-fifth Congress by the utilities district for water supply purposes, subject to such terms and conditions as the Secretary deems are consistent with the purposes of sections 459c to 459c-7 of this title.

-SOURCE-

(Pub. L. 87-657, Sec. 8, as added Pub. L. 95-625, title III, Sec. 318(e), Nov. 10, 1978, 92 Stat. 3487.)

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-5, 459c-6, 459c-7 of this title.

Sec. 459c-7. Authorization of appropriations; restriction on use of land

-STATUTE-

There are authorized to be appropriated such sums as may be necessary to carry out the provisions of sections 459c to 459c-7 of this title, except that no more than \$57,500,000 shall be appropriated for the acquisition of land and waters and improvements thereon, and interests therein, and incidental costs relating thereto, in accordance with the provisions of such sections: Provided, That no freehold, leasehold, or lesser interest in any lands hereafter acquired within the boundaries of the Point Reyes National Seashore shall be conveyed for residential or commercial purposes except for public accommodations, facilities, and services provided pursuant to sections 20 to 20g and 462(h) of this title. In addition to the sums heretofore authorized by this section, there is further authorized to be appropriated \$5,000,000 for the acquisition of lands or interests therein.

-SOURCE-

(Pub. L. 87-657, Sec. 9, formerly Sec. 8, Sept. 13, 1962, 76 Stat. 541; Pub. L. 89-666, Sec. 1(b), Oct. 15, 1966, 80 Stat. 919; renumbered Sec. 7 and amended Pub. L. 91-223, Sec. 1, 2(c), Apr. 3, 1970, 84 Stat. 90; renumbered Sec. 8, Pub. L. 94-544, Sec. 4(b), Oct. 18, 1976, 90 Stat. 2515; renumbered Sec. 8, Pub. L. 94-567, Sec. 7(b), Oct. 20, 1976, 90 Stat. 2695; renumbered Sec. 9, Pub. L. 95-625, title III, Sec. 318(e), Nov. 10, 1978, 92 Stat. 3487; amended Pub. L. 95-625, title III, Sec. 318(f), as added Pub. L. 96-199, title I, Sec. 101(a)(5), Mar. 5, 1980, 94 Stat. 67.)

REFERENCES IN TEXT

Sums “heretofore” authorized by this section, referred to in text, means sums authorized by this section prior to the enactment on Mar. 5, 1980, of Pub. L. 96-199, which added the authorization for a \$5,000,000 appropriation for the acquisition of lands or interest in lands.

CODIFICATION

Section 7(b) of Pub. L. 94-567 made the identical change in the credit as did section 4(b) of Pub. L. 94-544.

AMENDMENTS

1980 - Pub. L. 96-199 inserted provisions authorizing an appropriation of \$5,000,000 for the acquisition of lands or interests therein.

1970 - Pub. L. 91-223, Sec. 1, substituted “\$57,500,000” for “\$19,135,000”, restricted conveyances of any interest in any lands acquired after April 3, 1970, only for public accommodations, facilities, and services under provisions for concessions in areas administered by National Park Service.

1966 - Pub. L. 89-666 substituted “\$19,135,000” for “\$14,000,000”.

SECTION REFERRED TO IN OTHER SECTIONS

This section is referred to in sections 459c-2, 459c-4, 459c-5, 459c-6, 459c-6b of this title.

DOC1549

Assembly Bill No. 1024

CHAPTER 983

An act to convey certain tide and submerged lands to the United States in furtherance of the Point Reyes National Seashore.

[Approved by Governor July 9, 1965. Filed with Secretary of State July 9, 1965.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby granted to the United States, subject to the limitations which are described in Section 2 of this act, all of the right, title, and interest of the State of California, held by the state by virtue of its sovereignty in and to all of the tide and submerged lands or other lands beneath navigable waters situated within the boundaries of the Point Reyes National Seashore which the Secretary of the Interior is authorized to establish by authority of Public Law 87-657, 76 Stat. 538, and as such boundaries exist on the effective date of this act.

SEC. 2. There is hereby excepted and reserved to the State all deposits of minerals, including oil and gas, in the lands, and to the state, or persons authorized by the state, the right to prospect for, mine, and remove such deposits from the lands; provided, that no well or drilling operations of any kind shall be conducted upon the surface of such lands.

SEC. 3. There is hereby reserved to the people of the state the right to fish in the waters underlying the lands described in Section 1.

SEC. 4. If the United States ceases to use the lands for public purposes, all right, title and interest of the United States in and to such lands shall cease and the lands shall revert and rest in the state.

SEC. 5. The United States shall survey and monument the granted lands and record a description and plat thereof in the office of the County Recorder of Marin County.

90 STAT. 2692

PUBLIC LAW 94-567—OCT. 20, 1976

Public Law 94-567
94th Congress

An Act

Oct. 20, 1976
[H.R. 13160]

To designate certain lands within units of the National Park System as wilderness; to revise the boundaries of certain of those units; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in accordance with section 3(c) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1132(c)), the following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act:

(a) Bandelier National Monument, New Mexico, wilderness comprising twenty-three thousand two hundred and sixty-seven acres, depicted on a map entitled "Wilderness Plan, Bandelier National Monument, New Mexico", numbered 315-20,014-B and dated May 1976, to be known as the Bandelier Wilderness.

(b) Gunnison National Monument, Colorado, wilderness comprising eleven thousand one hundred and eighty acres, depicted on a map entitled "Wilderness Plan, Black Canyon of the Gunnison National Monument, Colorado", numbered 144-20,017 and dated May 1973, to be known as the Black Canyon of the Gunnison Wilderness.

(c) Chiricahua National Monument, Arizona, wilderness comprising nine thousand four hundred and forty acres, and potential wilderness additions comprising two acres, depicted on a map entitled "Wilderness Plan, Chiricahua National Monument, Arizona", numbered 145-20,007-A and dated September 1973, to be known as the Chiricahua National Monument Wilderness.

(d) Great Sand Dunes National Monument, Colorado, wilderness comprising thirty-three thousand four hundred and fifty acres, and potential wilderness additions comprising six hundred and seventy acres, depicted on a map entitled "Wilderness Plan, Great Sand Dunes National Monument, Colorado", numbered 140-20,006-C and dated February 1976, to be known as the Great Sand Dunes Wilderness.

(e) Haleakala National Park, Hawaii, wilderness comprising nineteen thousand two hundred and seventy acres, and potential wilderness additions comprising five thousand five hundred acres, depicted on a map entitled "Wilderness Plan, Haleakala National Park, Hawaii", numbered 162-20,006-A and dated July 1972, to be known as the Haleakala Wilderness.

(f) Isle Royale National Park, Michigan, wilderness comprising one hundred and thirty-one thousand eight hundred and eighty acres, and potential wilderness additions comprising two hundred and thirty-one acres, depicted on a map entitled "Wilderness Plan, Isle Royale National Park, Michigan", numbered 139-20,004 and dated December 1974, to be known as the Isle Royale Wilderness.

(g) Joshua Tree National Monument, California, wilderness comprising four hundred and twenty-nine thousand six hundred and ninety acres, and potential wilderness additions comprising thirty-seven thousand five hundred and fifty acres, depicted on a map entitled

PUBLIC LAW 94-567—OCT. 20, 1976

90 STAT. 2693

“Wilderness Plan, Joshua Tree National Monument, California”, numbered 156-20,003-D and dated May 1976, to be known as the Joshua Tree Wilderness.

(h) Mesa Verde National Park, Colorado, wilderness comprising eight thousand one hundred acres, depicted on a map entitled “Wilderness Plan, Mesa Verde National Park, Colorado”, numbered 307-20,007-A and dated September 1972, to be known as the Mesa Verde Wilderness.

Mesa Verde
National Park,
Colo.

(i) Pinnacles National Monument, California, wilderness comprising twelve thousand nine hundred and fifty-two acres, and potential wilderness additions comprising nine hundred and ninety acres, depicted on a map entitled “Wilderness Plan, Pinnacles National Monument, California”, numbered 114-20,010-D and dated September 1975, to be known as the Pinnacles Wilderness.

Pinnacles
National
Monument, Calif.

(j) Saguaro National Monument, Arizona, wilderness comprising seventy-one thousand four hundred acres, depicted on a map entitled “Wilderness Plan, Saguaro National Mounment, Arizona”, numbered 151-20,003-D and dated May 1976, to be known as the Saguaro Wilderness.

Saguaro National
Monument, Ariz.

(k) Point Reyes National Seashore, California, wilderness comprising twenty-five thousand three hundred and seventy acres, and potential wilderness additions comprising eight thousand and three acres, depicted on a map entitled “Wilderness Plan, Point Reyes National Seashore”, numbered 612-90,000-B and dated September 1976, to be known as the Point Reyes Wilderness.

Point Reyes
National
Seashore,
Calif.

(l) Badlands National Monument, South Dakota, wilderness comprising sixty-four thousand two hundred and fifty acres, depicted on a map entitled “Wilderness Plan, Badlands National Monument, South Dakota”, numbered 137-29,010-B and dated May 1976, to be known as the Badlands Wilderness.

Badlands
National
Monument,
S. Dak.

(m) Shenandoah National Park, Virginia, wilderness comprising seventy-nine thousand and nineteen acres, and potential wilderness additions comprising five hundred and sixty acres, depicted on a map entitled “Wilderness Plan, Shenandoah National Park, Virginia”, numbered 134-90,001 and dated June 1975, to be known as the Shenandoah Wilderness.

Shenandoah
National Park,
Va.

SEC. 2. A map and description of the boundaries of the areas designated in this Act shall be on file and available for public inspection in the office of the Director of the National Park Service, Department of the Interior, and in the office of the Superintendent of each area designated in the Act. As soon as practicable after this Act takes effect, maps of the wilderness areas and descriptions of their boundaries shall be filed with the Interior and Insular Affairs Committees of the United States Senate and House of Representatives, and such maps and descriptions shall have the same force and effect as if included in this Act: *Provided*, That correction of clerical and typographical errors in such maps and descriptions may be made.

Map and
description,
public inspection.

SEC. 3. All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness.

Publication in
Federal Register.
16 USC 1131
note.

SEC. 4. The boundaries of the following areas are hereby revised, and those lands depicted on the respective maps as wilderness or as potential wilderness addition are hereby so designated at such time and in such manner as provided for by this Act:

Boundary
revision.

90 STAT. 2694

PUBLIC LAW 94-567—OCT. 20, 1976

Isle Royale
National Park,
Mich.

(a) Isle Royale National Park, Michigan:
The Act of March 6, 1942 (56 Stat. 138; 16 U.S.C. 408e-408h), as amended, is further amended as follows:

(1) Insert the letter "(a)" before the second paragraph of the first section, redesignate subparagraphs (a), (b), and (c) of that paragraph as "(1)", "(2)", "(3)", respectively, and add to that section the following new paragraph:

"(b) Gull Islands, containing approximately six acres, located in section 19, township 68 north, range 31 west, in Keweenaw County, Michigan."

16 USC 408g.

(2) Amend section 3 to read as follows:

"SEC. 3. The boundaries of the Isle Royale National Park are hereby extended to include any submerged lands within the territorial jurisdiction of the United States within four and one-half miles of the shoreline of Isle Royale and the surrounding islands, including Passage Island and the Gull Islands, and the Secretary of the Interior is hereby authorized, in his discretion, to acquire title by donation to any such lands not now owned by the United States, the title to be satisfactory to him."

Pinnacles
National
Monument, Calif.

(b) Pinnacles National Monument, California:

(1) The boundary is hereby revised by adding the following described lands, totaling approximately one thousand seven hundred and seventeen and nine-tenths acres:

(a) Mount Diablo meridian, township 17 south, range 7 east: Section 1, east half east half, southwest quarter northeast quarter, and northwest quarter southeast quarter; section 12, east half northeast quarter, and northeast quarter southeast quarter; section 13, east half northeast quarter and northeast quarter southeast quarter.

(b) Township 16 south, range 7 east: Section 32, east half.

(c) Township 17 south, range 7 east: Section 4, west half; section 5, east half.

(d) Township 17 south, range 7 east: Section 6, southwest quarter southwest quarter; section 7, northwest quarter north half southwest quarter.

Publication in
Federal Register.

(2) The Secretary of the Interior may make minor revisions in the monument boundary from time to time by publication in the Federal Register of a map or other boundary description, but the total area within the monument may not exceed sixteen thousand five hundred acres: *Provided, however, That lands designated as wilderness pursuant to this Act may not be excluded from the monument. The monument shall hereafter be administered in accordance with the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1 et seq.), as amended and supplemented.*

(3) In order to effectuate the purposes of this subsection, the Secretary of the Interior is authorized to acquire by donation, purchase, transfer from any other Federal agency or exchange, lands and interests therein within the area hereafter encompassed by the monument boundary, except that property owned by the State of California or any political subdivision thereof may be acquired only by donation.

Appropriation
authorization.

(4) There are authorized to be appropriated, in addition to such sums as may heretofore have been appropriated, not to exceed \$955,000 for the acquisition of lands or interests in lands authorized by this subsection. No funds authorized to be appropriated pursuant to this Act shall be available prior to October 1, 1977.

PUBLIC LAW 94-567—OCT. 20, 1976

90 STAT. 2695

SEC. 5. (a) The Secretary of Agriculture shall, within two years after the date of enactment of this Act, review, as to its suitability or nonsuitability for preservation as wilderness, the area comprising approximately sixty-two thousand nine hundred and thirty acres located in the Coronado National Forest adjacent to Saguaro National Monument, Arizona, and identified on the map referred to in section 1(j) of this Act as the "Rincon Wilderness Study Area," and shall report his findings to the President. The Secretary of Agriculture shall conduct his review in accordance with the provisions of subsections 3(b) and 3(d) of the Wilderness Act, except that any reference in such subsections to areas in the national forests classified as "primitive" on the effective date of that Act shall be deemed to be a reference to the wilderness study area designated by this Act and except that the President shall advise the Congress of his recommendations with respect to this area within two years after the date of enactment of this Act.

Rincon
Wilderness Study
Area, suitability
review.
16 USC 1132
note.

Report to
President.
16 USC 1132.

(b) The Secretary of Agriculture shall give at least sixty days' advance public notice of any hearing or other public meeting relating to the review provided for by this section.

Notice and
hearing.

SEC. 6. The areas designated by this Act as wilderness shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act governing areas designated by that Act as wilderness areas, except that any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this Act, and, where appropriate, any reference to the Secretary of Agriculture shall be deemed to be a reference to the Secretary of the Interior.

Administration.

SEC. 7. (a) Section 6(a) of the Act of September 13, 1962 (76 Stat. 538), as amended (16 U.S.C. 459c-6a) is amended by inserting "without impairment of its natural values, in a manner which provides for such recreational, educational, historic preservation, interpretation, and scientific research opportunities as are consistent with, based upon, and supportive of the maximum protection, restoration and preservation of the natural environment with the area" immediately after "shall be administered by the Secretary".

16 USC 459c-6.

(b) Add the following new section 7 and redesignate the existing section 7 as section 8:

16 USC 459c-7.

"**SEC. 7.** The Secretary shall designate the principal environmental education center within the Seashore as 'The Clem Miller Environmental Education Center,' in commemoration of the vision and leadership which the late Representative Clem Miller gave to the creation and protection of Point Reyes National Seashore."

The Clem Miller
Environmental
Education
Center,
designation.
16 USC 459c-6a.
Whiskey
Mountain Area,
classification as a
primitive area.

SEC. 8. Notwithstanding any other provision of law, any designation of the lands in the Shoshone National Forest, Wyoming, known as the Whiskey Mountain Area, comprising approximately six thousand four hundred and ninety-seven acres and depicted as the "Whiskey Mountain Area—Glacier Primitive Area" on a map entitled "Proposed Glacier Wilderness and Glacier Primitive Area", dated September 23, 1976, on file in the Office of the Chief, Forest Service, Department of Agriculture, shall be classified as a primitive area until the Secretary of Agriculture or his designee determines otherwise pursuant to classification procedures for national forest primitive areas. Provisions of any other Act designating the Fitzpatrick Wil-

90 STAT. 2696

PUBLIC LAW 94-567—OCT. 20, 1976

derness in said Forest shall continue to be effective only for the approximately one hundred and ninety-one thousand one hundred and three acres depicted as the "Proposed Glacier Wilderness" on said map.

Approved October 20, 1976.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 94-1427 (Comm. on Interior and Insular Affairs).

SENATE REPORT No. 94-1357 (Comm. on Interior and Insular Affairs).

CONGRESSIONAL RECORD, Vol. 122 (1976):

Sept. 22, considered and passed House.

Oct. 1, considered and passed Senate, amended; House agreed to Senate amendments.

PUBLIC LAW 94-544 -- Oct. 18, 1976

90 STAT. 2515

Public Law 94-544
94th Congress

An Act

To designate certain lands in the Point Reyes National Seashore, California, as wilderness, amending the Act of September 13, 1962 (76 Stat. 538), as amended (16 U.S.C. 459c-6a), and for other purposes.

Oct. 18, 1976
[H.R. 8002]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in furtherance of the purposes of the Point Reyes National Seashore Act (76 Stat. 538 16 U.S.C. 459c), and of the Wilderness Act (78 Stat. 890: 16 U.S.C. 1131-36), and in accordance with section 3(c) of the Wilderness Act, the following lands within the Point Reyes National Seashore are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act: those lands comprising twenty-five thousand three hundred and seventy acres, and potential wilderness additions comprising eight thousand and three acres, depicted on a map entitled "Wilderness Plan, Point Reyes National Seashore", numbered 612-90,000-B and dated September 1976, to be known as the Point Reyes Wilderness.

Point Reyes
National
Seashore, Calif.
Certain lands
designated as
wilderness areas.
16 USC 1132

note.
16 USC 1132
16 USC 1131
note.

SEC. 2. As soon as practicable after this Act takes effect, the Secretary of the Interior shall file a map of the wilderness area and a description of its boundaries with the Interior and Insular Affairs Committees of the United States Senate and House of Representatives, and such map and descriptions shall have the same force and effect as if included in this Act; *Provided, however,* That correction of clerical and typographical errors in such map and descriptions may be made.

Map and
description, filing
with
congressional
committees.

SEC. 3. The area designated by this Act as wilderness shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act governing areas designated by that Act as wilderness areas, except that any reference in such provisions to the effective date of this Act, and, where appropriate, any reference to the Secretary of Agriculture, shall be deemed to be a reference to the Secretary of the Interior.

Administration.

SEC. 4 (a) Amend the Act of September 13, 1962 (76 Stat. 538), as amended (16 U.S.C. 459c-6a), as follow:

16 USC 459c-6.

In section 6(a) insert immediately after the words "shall be administered by the Secretary," the words "without impairment of its natural values, in a manner which provides for such recreational, educational, historic preservation, interpretation, and scientific research opportunities as are consistent with, based upon, and supportive of the maximum protection, restoration, and preservation of the natural environment within the area,".

(b) Add the following new section 7 and redesignate the existing section 7 as section 8:

16 USC 459c-7.
The Clem Miller
Environmental
Education Center,
designation.
16 USC 459c-6a.

"Sec. 7. The Secretary shall designate the principal environmental education center within the seashore as 'The Clem Miller Environ-

90 STAT. 2516

PUBLIC LAW 94-544 -- Oct. 18, 1976

mental Education Center', in commemoration of the vision and leadership which the late Representative Clem Miller gave to the creation and protection of Point Reyes National Seashore."

Approved October 18, 1976.

LEGISLATIVE HISTORY

HOUSE REPORT No. 94-1680 (Comm. on Interior and Insular Affairs).

CONGRESSIONAL RECORD, Vol. 122 (1976):

Sept. 29, considered and passed House.

Oct. 1, considered and passed Senate.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 12, No. 43:

On. 19. Presidential statement.

WILDERNESS ACT

Public Law 88-577 (16 U.S.C. 1131-1136)
88th Congress, Second Session
September 3, 1964

AN ACT

To establish a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

Short Title

Section 1. This Act may be cited as the "Wilderness Act."

WILDERNESS SYSTEM ESTABLISHED STATEMENT OF POLICY

Section 2.(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as "wilderness areas", and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness; and no Federal lands shall be designated as "wilderness areas" except as provided for in this Act or by a subsequent Act.

(b) The inclusion of an area in the National Wilderness Preservation System notwithstanding, the area shall continue to be managed by the Department and agency having jurisdiction thereover immediately before its inclusion in the National Wilderness Preservation System unless otherwise provided by Act of Congress. No appropriation shall be available for the payment of expenses or salaries for the administration of the National Wilderness Preservation System as a separate unit nor shall any appropriations be available for additional personnel stated as being required solely for the purpose of managing or administering areas solely because they are included within the National Wilderness Preservation System.

DEFINITION OF WILDERNESS

(c) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

NATIONAL WILDERNESS PRESERVATION SYSTEM - EXTENT OF SYSTEM

Section 3.(a) All areas within the national forests classified at least 30 days before September 3, 1964 by the Secretary of Agriculture or the Chief of the Forest Service as "wilderness", "wild", or "canoe" are hereby designated as wilderness areas. The Secretary of Agriculture shall -

(1) Within one year after September 3, 1964, file a map and legal description of each wilderness area with the Interior and Insular Affairs Committees of the United States Senate and the House of Representatives, and such descriptions shall have the same force and effect as if included in this Act: Provided, however, That correction of clerical and typographical errors in such legal descriptions and maps may be made.

(2) Maintain, available to the public, records pertaining to said wilderness areas, including maps and legal descriptions, copies of regulations governing them, copies of public notices of, and reports submitted to Congress regarding pending additions, eliminations, or modifications. Maps, legal descriptions, and regulations pertaining to wilderness areas within their respective jurisdictions also shall be available to the public in the offices of regional foresters, national forest supervisors, and forest rangers.

Classification. (b) The Secretary of Agriculture shall, within ten years after September 3, 1964, review, as to its suitability or nonsuitability for preservation as wilderness, each area in the national forests classified on September 3, 1964 by the Secretary of Agriculture or the Chief of the Forest Service as "primitive" and report his findings to the President.

Presidential recommendation to Congress. The President shall advise the United States Senate and House of Representatives of his recommendations with respect to the designation as "wilderness" or other reclassification of each area on which review has been completed, together with maps and a definition of boundaries. Such advice shall be given with respect to not less than one-third of all the areas now classified as "primitive" within three years after September 3, 1964, not less than two-thirds within seven years after September 3, 1964, and the remaining areas within ten years after September 3, 1964.

Congressional approval. Each recommendation of the President for designation as "wilderness" shall become effective only if so provided by an Act of Congress. Areas classified as "primitive" on September 3, 1964 shall continue to be administered under the rules and regulations affecting such areas on September 3, 1964 until Congress has determined otherwise. Any such area may be increased in size by the President at the time he submits his recommendations to the Congress by not more than five thousand acres with no more than one thousand two hundred and eighty acres of such increase in any one compact unit; if it is proposed to increase the size of any such area by more than five thousand acres or by more than one thousand two hundred and eighty acres in any one compact unit the increase in size shall not become effective until acted upon by Congress. Nothing herein contained shall limit the President in proposing, as part of his recommendations to Congress, the alteration of existing boundaries of primitive areas or recommending the addition of any contiguous area of national forest lands predominantly of wilderness value. Notwithstanding any other provisions of this Act, the Secretary of Agriculture may complete his review and delete such area as may be necessary, but not to exceed seven thousand acres, from the southern tip of the Gore Range-Eagles Nest Primitive Area, Colorado, if the Secretary determines that such action is in the public interest.

Report to President. (c) Within ten years after September 3, 1964 the Secretary of the Interior shall review every roadless area of five thousand contiguous acres or more in the national parks, monuments and other units of the national park system and every such area of, and every roadless island within the national wildlife refuges and game ranges, under his jurisdiction on September 3, 1964 and shall report to the President his recommendation as to the suitability or nonsuitability of each such area or island for preservation as wilderness.

Presidential recommendation to Congress. The President shall advise the President of the Senate and the Speaker of the House of Representatives of his recommendation with respect to the designation as wilderness of each such area or island on which review has been completed, together with a map thereof and a definition of its boundaries. Such advice shall be given with respect to not less than one-third of the areas and islands to be reviewed under this subsection within three years after September 3, 1964, not less than two-thirds within seven years of September 3, 1964 and the remainder within ten years of September 3, 1964.

Congressional approval. A recommendation of the President for designation as wilderness shall become effective only if so provided by an Act of Congress. Nothing contained herein shall, by implication or otherwise, be construed to lessen the present statutory authority of the

Secretary of the Interior with respect to the maintenance of roadless areas within units of the national park system.

Suitability. (d)(1) The Secretary of Agriculture and the Secretary of the Interior shall, prior to submitting any recommendations to the President with respect to the suitability of any area for preservation as wilderness –

Publication in Federal Register. (A) give such public notice of the proposed action as they deem appropriate, including publication in the Federal Register and in a newspaper having general circulation in the area or areas in the vicinity of the affected land;

Hearings. (B) hold a public hearing or hearings at a location or locations convenient to the area affected. The hearings shall be announced through such means as the respective Secretaries involved deem appropriate, including notices in the Federal Register and in newspapers of general circulation in the area: Provided, That if the lands involved are located in more than one State, at least one hearing shall be held in each State in which a portion of the land lies;

(C) at least thirty days before the date of a hearing advise the Governor of each State and the governing board of each county, or in Alaska the borough, in which the lands are located, and Federal departments and agencies concerned, and invite such officials and Federal agencies to submit their views on the proposed action at the hearing or by no later than thirty days following the date of the hearing.

Any views submitted to the appropriate Secretary under the provisions of (1) of this subsection with respect to any area shall be included with any recommendations to the President and to Congress with respect to such area.

Proposed modification. (e) Any modification or adjustment of boundaries of any wilderness area shall be recommended by the appropriate Secretary after public notice of such proposal and public hearing or hearings as provided in subsection (d) of this section. The proposed modification or adjustment shall then be recommended with map and description thereof to the President. The President shall advise the United States Senate and the House of Representatives of his recommendations with respect to such modification or adjustment and such recommendations shall become effective only in the same manner as provided for in subsections (b) and (c) of this section.

USE OF WILDERNESS AREAS

Section 4.(a) The purposes of this Act are hereby declared to be within and supplemental to the purposes for which national forests and units of the national park and national wildlife refuge systems are established and administered and –

(1) Nothing in this Act shall be deemed to be in interference with the purpose for which national forests are established as set forth in the Act of June 4, 1897 (30 Stat. 11), and the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 Stat. 215) (16 U.S.C. 528-531).

(2) Nothing in this Act shall modify the restrictions and provisions of the Shipstead-Nolan Act (Public Law 539, Seventy-first Congress, July 10, 1930; 46 Stat. 1020), the Thye-Blatnik Act (Public Law 733, Eightieth Congress, June 22, 1948; 62 Stat. 568), and the Humphrey-Thye-Blatnik-Andresen Act (Public Law 607, Eighty-Fourth Congress, June 22, 1956; 70 Stat. 326), as applying to the Superior National Forest or the regulations of the Secretary of Agriculture.

(3) Nothing in this Act shall modify the statutory authority under which units of the national park system are created. Further, the designation of any area of any park, monument, or other unit of the national park system as a wilderness area pursuant to this Act shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system in accordance with sections 1, 2, 3, and 4 of this title, the statutory authority under which the area was created, or any other Act of Congress which might pertain to or affect such area, including, but not limited to, the Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 432 et seq.); section 3(2) of the Federal Power Act (16 U.S.C. 796(2)); and the Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 461 et seq.).

(b) Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this

Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

PROHIBITION OF CERTAIN USES

(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

SPECIAL PROVISIONS

(d) The following special provisions are hereby made:

(1) Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary of Agriculture deems desirable. In addition, such measures may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.

(2) Nothing in this Act shall prevent within national forest wilderness areas any activity, including prospecting, for the purpose of gathering information about mineral or other resources, if such activity is carried on in a manner compatible with the preservation of the wilderness environment. Furthermore, in accordance with such program as the Secretary of the Interior shall develop and conduct in consultation with the Secretary of Agriculture, such areas shall be surveyed on a planned, recurring basis consistent with the concept of wilderness preservation by the United States Geological Survey and the United States Bureau of Mines to determine the mineral values, if any, that may be present; and the results of such surveys shall be made available to the public and submitted to the President and Congress.

Mineral leases, claims, etc. (3) Notwithstanding any other provisions of this Act, until midnight December 31, 1983, the United States mining laws and all laws pertaining to mineral leasing shall, to the extent as applicable prior to September 3, 1964, extend to those national forest lands designated by this Act as "wilderness areas"; subject, however, to such reasonable regulations governing ingress and egress as may be prescribed by the Secretary of Agriculture consistent with the use of the land for mineral location and development and exploration, drilling, and production, and use of land for transmission lines, waterlines, telephone lines, or facilities necessary in exploring, drilling, producing, mining, and processing operations, including where essential the use of mechanized ground or air equipment and restoration as near as practicable of the surface of the land disturbed in performing prospecting, location, and , in oil and gas leasing, discovery work, exploration, drilling, and production, as soon as they have served their purpose. Mining locations lying within the boundaries of said wilderness areas shall be held and used solely for mining or processing operations and uses reasonably incident thereto; and hereafter, subject to valid existing rights, all patents issued under the mining laws of the United States affecting national forest lands designated by this Act as wilderness areas shall convey title to the mineral deposits within the claim, together with the right to cut and use so much of the mature timber therefrom as may be needed in the extraction, removal, and beneficiation of the mineral deposits, if needed timber is not otherwise reasonably available, and if the timber is cut under sound principles of forest management as defined by the national forest rules and regulations, but each such patent shall reserve to the United States all title in or to the surface of the lands and products thereof, and no use of the surface of the claim or the resources therefrom not reasonably required for carrying on mining or prospecting shall be allowed except as otherwise expressly provided in this Act: Provided, That, unless hereafter specifically authorized, no patent within wilderness areas designated by this Act shall issue after December 31, 1983, except for the valid claims existing on or before December 31, 1983. Mining claims located after September 3, 1964, within the boundaries of wilderness areas designated by this Act shall create no rights in excess of those rights which may be patented under the provisions of this subsection. Mineral leases, permits, and licenses covering lands within national forest wilderness areas designated by this Act shall contain such reasonable stipulations as may

be prescribed by the Secretary of Agriculture for the protection of the wilderness character of the land consistent with the use of the land for the purposes for which they are leased, permitted, or licensed. Subject to valid rights then existing, effective January 1, 1984, the minerals in lands designated by this Act as wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and all amendments thereto.

Water resources and grazing. (4) Within wilderness areas in the national forests designated by this Act, **(1)** the President may, within a specific area and in accordance with such regulations as he may deem desirable, authorize prospecting for water resources, the establishment and maintenance of reservoirs, water-conservation works, power projects, transmission lines, and other facilities needed in the public interest, including the road construction and maintenance essential to development and use thereof, upon his determination that such use or uses in the specific area will better serve the interests of the United States and the people thereof than will its denial; and **(2)** the grazing of livestock, where established prior to September 3, 1964, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture.

(5) Other provisions of this Act to the contrary notwithstanding, the management of the Boundary Waters Canoe Area, formerly designated as the Superior, Little Indian Sioux, and Caribou Roadless Areas, in the Superior National Forest, Minnesota, shall be in accordance with regulations established by the Secretary of Agriculture in accordance with the general purpose of maintaining, without unnecessary restrictions on other uses, including that of timber, the primitive character of the area, particularly in the vicinity of lakes, streams, and portages: Provided, That nothing in this Act shall preclude the continuance within the area of any already established use of motorboats.

(6) Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas.

(7) Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exemption from State water laws.

(8) Nothing in this Act shall be construed as affecting the jurisdiction or responsibilities of the several States with respect to wildlife and fish in the national forests.

STATE AND PRIVATE LANDS WITHIN WILDERNESS AREAS

Section 5.(a) In any case where State -owned or privately owned land is completely surrounded by national forest lands within areas designated by this Act as wilderness, such State or private owner shall be given such rights as may be necessary to assure adequate access to such State -owned or privately owned land by such State or private owner and their successors in interest, or the State -owned land or privately owned land shall be exchanged for federally owned land in the same State of approximately equal value under authorities available to the Secretary of Agriculture:

Transfers, restriction. Provided, however, That the United States shall not transfer to a State or private owner any mineral interests unless the State or private owner relinquishes or causes to be relinquished to the United States the mineral interest in the surrounded land.

(b) In any case where valid mining claims or other valid occupancies are wholly within a designated national forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounded areas by means which have been or are being customarily enjoyed with respect to other such areas similarly situated.

Acquisition. (c) Subject to the appropriation of funds by Congress, the Secretary of Agriculture is authorized to acquire privately owned land within the perimeter of any area designated by this Act as wilderness if **(1)** the owner concurs in such acquisition or **(2)** the acquisition is specifically authorized by Congress.

GIFTS, BEQUESTS, AND CONTRIBUTIONS

Section 6.(a) The Secretary of Agriculture may accept gifts or bequests of land within wilderness areas designated by this Act for preservation as wilderness. The Secretary of Agriculture may also accept gifts or bequests of land adjacent to wilderness areas designated by this Act for preservation as wilderness if he has given sixty days advance notice thereof to the President of the Senate and the Speaker of the House of Representatives. Land

accepted by the Secretary of Agriculture under this section shall be come part of the wilderness area involved. Regulations with regard to any such land may be in accordance with such agreements, consistent with the policy of this Act, as are made at the time of such gift, or such conditions, consistent with such policy, as may be included in, and accepted with, such bequest.

(b) Authorization to accept private contributions and gifts The Secretary of Agriculture or the Secretary of the Interior is authorized to accept private contributions and gifts to be used to further the purposes of this Act.

ANNUAL REPORTS

Section 7. At the opening of each session of Congress, the Secretaries of Agriculture and Interior shall jointly report to the President for transmission to Congress on the status of the wilderness system, including a list and descriptions of the areas in the system, regulations in effect, and other pertinent information, together with any recommendations they may care to make.

APPROVED SEPTEMBER 3, 1964.

Legislative History:

House Reports: No 1538 accompanying H.R. 9070 (Committee on Interior & Insular Affairs) and No. 1829 (Committee of Conference).

Senate report: No. 109 (Committee on Interior & Insular Affairs). Congressional Record: Vol. 109 (1963):

- April 4, 8, considered in Senate.
- April 9, considered and passed Senate.
- Vol. 110 (1964): July 28, considered in House.
- July 30, considered and passed House, amended, in lieu of H.R. 9070
 - August 20, House and Senate agreed to conference report.

PUBLIC LAW 99-68 [H.R. 1373]; July 19, 1985

PHILLIP BURTON WILDERNESS, CALIFORNIA

An Act to designate the wilderness in the Point Reyes National Seashore in California as the Phillip Burton Wilderness.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. PHILLIP BURTON WILDERNESS.

16 USC 1132
note.

(a) In recognition of Congressman Phillip Burton's dedication to the protection of the Nation's outstanding natural, scenic, and cultural resources and his leadership in establishing units of the National Park System and preserving their integrity against threats to those resources and specifically his tireless efforts which led to the enactment of the California Wilderness Act of 1984, the designated wilderness area of Point Reyes National Seashore, California as established pursuant to law, shall henceforth be known as the "Phillip Burton Wilderness".

98 Stat. 1619.

(b) In order to carry out the provisions of this Act, the Secretary of the Interior is authorized and directed to provide such identification by signs, including, but not limited to changes in existing signs, materials, maps, markers, interpretive programs or other means as will adequately inform the public of the designation of the wilderness and the reason therefor.

(c) **REFERENCES**—Nothing in this Act shall affect the management of (or the application of any rule, regulation, or provision of law to) any area within the Point Reyes National Seashore, except that all references to the "Point Reyes Wilderness" or to "the wilderness in the Point Reyes National Seashore" which appear in any rule, regulation, provision of law or other official document shall hereafter be deemed to be references to the Phillip Burton Wilderness Area.

Appropriation
authorization.

(d) There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act.

Approved July 19, 1985.

LEGISLATIVE HISTORY — H.R. 1373:

HOUSE REPORT No 99-91 (Comm on Interior and Insular Affairs)

SENATE REPORT No 99-95 (Comm on Energy and Natural Resources)

CONGRESSIONAL RECORD, Vol 131 (1985)

Apr 2, considered and passed House

July 9, considered and passed Senate

Dated: November 9, 1999.

John J. Reynolds,

Regional Director, Pacific West Region.

[FR Doc. 99-30112 Filed 11-17-99; 8:45 am]

BILLING CODE 4310-70-M

DEPARTMENT OF THE INTERIOR

National Park Service

Notice of Designation of Potential Wilderness as Wilderness, Point Reyes National Seashore

AGENCY: National Park Service, Interior

ACTION: Notice.

Public Law 94-567, approved October 20, 1976, designated 25,370 acres in Point Reyes National Seashore as Wilderness, and further identified 8,003 acres as potential wilderness additions in maps entitled "Wilderness Plan, Point Reyes National Seashore", numbered 612-90,000-B and dated September 1976. These maps showing the wilderness area and potential wilderness additions are on file at the headquarters of Point Reyes National Seashore, Point Reyes Station, California, 94956.

Section 3 of Public Law 94-567 provided a process whereby potential wilderness additions within the Point Reyes National Seashore would convert to designated wilderness upon publication in the *Federal Register* of a notice that all uses of the land, prohibited by the Wilderness Act (Pub. L. 88-577), have ceased.

The National Park Service has determined that all Wilderness Act prohibited activities on the following described designated potential wilderness additions have ceased. The lands are located in the Muddy Hollow, Abbotts Lagoon, and Limantour Area and are described on map 612-60, 189. Such lands are entirely in Federal ownership. Because such lands now fully comply with congressional direction in Section 3 of Public Law 94-567, this notice hereby effects the change in status of the lands in these areas to designated wilderness, totaling 1,752 acres, more or less. The map showing this change is on file at the headquarters of Point Reyes National Seashore, Point Reyes Station, California, 94956.

This notice hereby changes the total wilderness acreage within Point Reyes National Seashore to 27,122 acres. The potential wilderness additions remaining consist of 6,251 more or less. The remaining potential wilderness areas will remain as such until all uses conflicting with the provisions of the Wilderness Act have ceased.

Note that Congress in Public Law 99-68, approved on July, 1985, designated that the wilderness area of Point Reyes National Seashore, to be known as the "Phillip Burton Wilderness."

Dated: October 29, 1999.

Robert Stanton,

Director, National Park Service.

[FR Doc. 99-29779 Filed 11-17-99; 8:45 am]

BILLING CODE 4310-70-P

DEPARTMENT OF LABOR

Office of the Secretary

Submission for OMB Review; Comment Request

November 9, 1999.

The Department of Labor (DOL) has submitted the following public information collection requests (ICRs) to the Office of Management and Budget (OMB) for review and approval in accordance with the Paperwork Reduction Act of 1995 (Pub. L. 104-13, 44 U.S.C. Chapter 35). A copy of each individual ICR, with applicable supporting documentation, may be obtained by calling the Department of Labor. To obtain documentation for BLS, ETA, PWBA, and OASAM contact Karin Kurz ({202} 219-5096 ext. 159 or by E-mail to Kurz-Karin@dol.gov). To obtain documentation for ESA, MSHA, OSHA, and VETS contact Darrin King ({202} 219-5096 ext. 151 or by E-Mail to King-Darrin@dol.gov).

Comments should be sent to Office of Information and Regulatory Affairs, Attn: OMB Desk Officer for BLS, DM, ESA, ETA, MSHA, OSHA, PWBA, or VETS, Office of Management and Budget, Room 10235, Washington, DC 20503 ({202} 395-7316), within 30 days from the date of this publication in the *Federal Register*.

The OMB is particularly interested in comments which:

- Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;
- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Enhance the quality, utility, and clarity of the information to be collected; and
- Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated,

electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses.

Agency: Occupational Safety and Health Administration (OSHA).

Title: Shipyard Certification Records (29 CFR 1915.113(b)(1) and 1915.172(d)).

OMB Number: 1281-0220.

Frequency: On occasion; Quarterly; Annually.

Affected Public: Business or other for-profit; not-for-profit institutions; Federal Government; State, Local or Tribal Government.

Number of Respondents: 900.

Estimated Time Per Respondent: 3 to 20 minutes.

Total Burden Hours: 4461.

Total Annualized capital/startup costs: \$0.

Total annual costs (operating/maintaining systems or purchasing services): \$0.

Description: The Standard for shackles and hooks (29 CFR 1915.113(b)(1)) requires that all hooks for which no applicable manufacturer's recommendations are available shall be tested to twice their intended safe work load before they are initially put into use, and that the employer shall maintain a certification record. The standard for portable air receivers (29 CFR 1915.172(d)) requires that portable, unfired pressure vessels, not built to the code requirements of 1915.172(a), shall be examined quarterly by a competent person and that they be subjected yearly to a hydrostatic pressure test of one and one-half times the working pressure of the vessels. A certification record of these examinations and tests shall be maintained.

The information collection requirements contained in 29 CFR 1915.113(b)(1) and 29 CFR 1915.172(d) (shipyard certification records) ensures that employees properly inform employees about the condition of shackles and hooks, and portable air receivers and other unfired pressure vessels, in shipyards. The information collection requirements also verify that employers are in compliance with the standard. OSHA compliance officers may require employers to disclose the required certification records at the time of an inspection.

Ira L. Mills,

Departmental Clearance Officer.

[FR Doc. 99-30120 Filed 11-17-99; 8:45 am]

BILLING CODE 4510-26-M

C

STATEMENT OF PRINCIPLES

STATEMENT OF PRINCIPLES

FEB 24 2010 10:30PM

5104190143

P. 2

Statement of Principles Regarding NEPA evaluation for Special Use Permit for Drakes Bay Oyster Company

- The Parties are NPS and Drakes Bay Oyster Company (DBOC). For the purposes of this document, DBOC consists of the owners of DBOC and its representatives.
- Parties will have at least one in-person meeting prior to public scoping. Prior to the initial meeting, NPS will advise DBOC of any scientific, technical, or other information that the NPS believes should be considered during the NEPA process. NPS agrees to consider in good faith any additional information DBOC believes is appropriate for consideration. If NPS determines that any of the information submitted by DBOC is not necessary or relevant to the NEPA process, NPS will explain its rationale in the scoping report, the NEPA documents, or the administrative record for the NEPA process. DBOC will endeavor to provide all such information to the NPS at this initial meeting.
- If the NPS needs information regarding DBOC's operations, DBOC will provide timely responses to NPS requests for such information.
- NPS, in cooperation with DBOC, will prepare a schedule for completing NEPA review. Such schedule will include specific target dates for scoping, public hearings (if appropriate), the release of the EA for public comment, the public comment period, and the issuance of the FONSI or the initiation of an EIS. If NPS determines that an EIS is necessary, the same coordination efforts set forth herein will also apply in the preparation of the EIS.
- NPS will consider DBOC's interests in applying for and receiving a special use permit in developing the purpose and need for the NEPA document.
- DBOC shall prepare a description of their operations for NEPA evaluation, which NPS shall consider in good faith. NPS will consult in good faith with DBOC on the purpose and need of the project as needed, particularly during impact analysis, to assist in improving the preferred alternative to avoid, mitigate or otherwise address any adverse impacts.
- After the National Academy of Sciences produces its first report (specific to Drakes Estero) and NPS and DBOC meet and confer in good faith regarding same, the NPS will begin preparing the those portions of the NEPA document concerning off-shore activities, including sections concerning the affected environment, alternatives, environmental consequences, and mitigation measures, unless otherwise agreed to by the Parties. Notwithstanding the foregoing, NPS may begin preparing those portions of the NEPA document concerning offshore activities that analyze air quality, cultural resources and the socioeconomic environment.
- NPS agrees to consult with DBOC in good faith in the design of any further scientific or technical studies to assist in NEPA evaluation of the project.
- As part of public scoping, DBOC may provide comments regarding proposed alternatives, and the NPS will consider such comments.
- DBOC may provide formal comments during the public comment period for the NEPA document.

FEB 24 2010 10:30PM

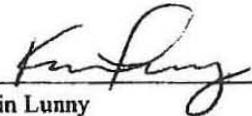
5104190143

p. 3

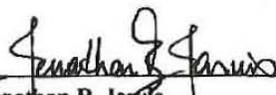
- DBOC will not be required to cover the cost of preparing the NEPA document. If there is litigation regarding NEPA compliance, it will not trigger the indemnification requirements set forth in the Special Use Permit.
- The Parties will exert best efforts to effectuate the principles set forth herein.
- The Parties will enter into a Memorandum of Understanding or similar agreement consistent with the principles set forth herein as soon as practicable. The NEPA actions contemplated by the principles set forth herein shall be initiated after the Parties enter into the Memorandum of Understanding or similar agreement. Notwithstanding the foregoing, NPS may initiate the contemplated NEPA actions if the Parties are unable to enter into a Memorandum of Understanding or similar agreement within sixty (60) days of the date of this Statement of Principles; provided, however than any such actions shall be consistent with this Statement of Principles and the Parties will continue to make best efforts to enter into a Memorandum of Understanding or similar agreement.

IT IS SO AGREED:

Drakes Bay Oyster Company

By: 
Kevin LunnyDated: 4/22/08

National Park Service

By: 
Jonathan B. Jarvis
Regional Director
Pacific West RegionDated: 4/17/2008

LEGAL_US_W #58722736.1

D

RELEVANT AGENCY CORRESPONDENCE

- Letter from the Seashore, to Interested Party, regarding Public Scoping, dated 10/8/10
- Letter from the Seashore, to EPA, regarding Cooperating Agency Request, dated 10/14/10
- Letter from CCC, to the Seashore, regarding Cooperating Agency Response, dated 11/9/10
- Letter from USACE, to the Seashore, regarding Cooperating Agency Response, dated 11/16/10
- Letter from State Clearinghouse and Planning Unit, to Reviewing Agencies, regarding Notice of Intent, dated 11/17/10
- Letter from USFWS, to the Seashore, regarding Species List Request Response, dated 11/17/10
- Letter from OCRM, to CCC, regarding Request of the CCC to Review NPS SUP Application by DBOC for Aquaculture Operations, dated 3/30/2011
- Letter from the Seashore, to SHPO, regarding Notification of Intent to Use NEPA Process to Meet Section 106 Obligations at Pt. Reyes National Seashore, dated 4/1/11
- Letter from the Seashore, to SHPO, regarding Request for Concurrence, Determination of Eligibility, dated 4/5/11
- Letter from Advisory Council on Historic Preservation, to the Seashore, regarding Scoping Response, dated 4/18/11
- Letter from the Seashore, to MMC, regarding Cooperating Agency Request, dated 6/2/11
- Letter from the Seashore, to SHPO, regarding Request for Concurrence, dated 7/8/11
- Letter from SHPO, to the Seashore, regarding Concurrence, dated 8/4/11
- Letter from the Seashore, to FIGR, regarding Notification of Intent to Use NEPA Process to Meet Section 106 Obligations at Pt. Reyes National Seashore, dated 8/10/11
- Letter from FIGR, to the Seashore, regarding Section 106, dated 8/29/11
- Letter from Native American Heritage Commission, to the Seashore, regarding Notice of Completion, dated 10/13/11
- Letter from NMFS, to the Seashore, regarding Comments on the Draft EIS, dated 11/17/11
- Letter from EPA, to the Seashore, regarding Comments on the Draft EIS, dated 12/5/11
- Letter from NMFS, to the Seashore, regarding Points of Clarification on Previous Comment Letter, dated 12/8/11

- Letter from USACE, to the Seashore, regarding Comments on the Draft EIS, dated 12/8/11
- Letter from CDFG, to the Seashore, regarding Comments on the Draft EIS, dated 12/20/11
- Letter from the Seashore, to SHPO, regarding Request to Meet Regarding Section 106 Consultation, dated 1/9/12
- Letter from the Seashore, to FIGR, regarding Draft EIS, dated 1/9/12
- Letter from FIGR, to the Seashore, regarding Section 106 Consultation, dated 8/13/12
- Letter from Advisory Council on Historic Preservation, to the Seashore, regarding Receipt of Draft EIS Document, dated 10/18/12
- Letter from SHPO, to the Seashore, regarding Concurrence with Finding of No Adverse Effects, dated 10/29/12



United States Department of the Interior

NATIONAL PARK SERVICE

Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617

October 8, 2010

Dear Interested Party:

The National Park Service (NPS) is beginning the preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) to evaluate a potential issuance of a Special Use Permit for commercial oyster operations within Drakes Estero at Point Reyes National Seashore. Public scoping is the first step to involve the public in the NEPA process. Scoping includes holding meetings (see page 2) and providing opportunities for the public to comment so that their concerns are identified early and the analysis is focused on important issues.

The NPS encourages comments on the draft purpose and need, and requests that the public identify topics and concerns that should be addressed in the EIS. Commenters are also encouraged to bring forward any new information that the NPS may not be aware of that would be of use in preparing the EIS.

Project Purpose and Need

Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a Special Use Permit for a period of 10 years to Drakes Bay Oyster Company (DBOC) for commercial harvesting and processing of shellfish at Point Reyes National Seashore. The existing Reservation of Use and Occupancy and associated Special Use Permit held by DBOC expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing permit.

On behalf of the Secretary, the NPS will use the NEPA process to engage the public and evaluate the effects of continuing the commercial operation within the national park. The results of the NEPA process will be used to inform the decision of whether a new Special Use Permit should be issued to DBOC for a period of 10 years.

Project Objectives

- Manage natural and cultural resources to support their maximum protection, restoration, and preservation.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.

- Engage a broad spectrum of the public and relevant agencies in the NEPA process.

Scoping Meetings

The National Park Service will be hosting three public meetings during the initial scoping phase of this process. The open house style meetings will be identical in format and are intended to gather comments from the public that will be used in shaping the EIS. The meetings are scheduled at the following locations:

Tuesday October 26, 2010, 6-8pm

Dance Palace Community Center
503 B Street
Point Reyes Station, CA 94965

Wednesday October 27, 2010, 6-8 pm

Multi-Purpose Room, Bay Model Visitor Center
2100 Bridgeway
Sausalito, CA 94965-1753

Thursday October 28, 2010, 6-8 pm

Community Room, REI Berkeley
1338 San Pablo Avenue
Berkeley, CA 94702

Public Comment

If you cannot attend one of the public scoping meetings or would like to provide comment in another form, you can still participate online or in writing. The preferred method for submitting comments is via the internet through the NPS Planning, Environment and Public Comment site at <http://parkplanning.nps.gov/pore>. From the main page, click on the Drakes Bay Oyster Company Special Use Permit EIS link, and then on the “Scoping Letter” link to comment. You may also mail or hand deliver comments to “DBOC SUP EIS c/o Superintendent, Point Reyes National Seashore, 1 Bear Valley Road, Point Reyes Station, CA 94956”. Written comments will also be accepted at the public meetings.

The comment period will close 30 days after publication of the Notice of Intent to Prepare an EIS in the Federal Register and will be announced via press release and on the park’s website (www.nps.gov/pore).

Comments will not be accepted by FAX, e-mail, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to

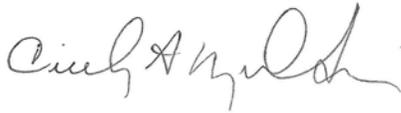
withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Project timeline

- October/November 2010: Public Scoping
- Fall 2011: Draft EIS released with 60-day public review and comment period
- Summer 2012: Final EIS completed and released
- July 2012: Record of Decision signed

If you have questions regarding this process, please contact Outreach Coordinator Melanie Gunn at Point Reyes National Seashore at (415) 464-5162. We appreciate your participation in this process.

Sincerely,

A handwritten signature in cursive script, appearing to read "Cicely A. Muldoon".

Cicely A. Muldoon
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE

Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617
(DBOC SUP EIS)

October 14, 2010

Mr. Jared Blumenfeld, Regional Director
US Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105

Dear Mr. Blumenfeld:

The National Park Service (NPS) is beginning the preparation of an Environmental Impact Statement (EIS) to evaluate a potential issuance of a Special Use Permit for commercial oyster operations within Drakes Estero at Point Reyes National Seashore. Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a special use permit for a period of 10 years to Drakes Bay Oyster Company (DBOC) for commercial harvesting and processing of shellfish at Point Reyes National Seashore. The existing Reservation of Use and Occupancy and associated special use permit held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing permit.

On behalf of the Secretary, the NPS will use the National Environmental Policy Act (NEPA) process to engage the public and evaluate the effects of continuing the commercial operation within the national park. The results of the NEPA process will be used to inform the decision of whether a new special use permit should be issued to DBOC for a period of 10 years.

In accordance with the NEPA PL 91-190 USC 4321, and the Council of Environmental Quality (CEQ) Regulations Section 1501.5 and 1501.6, the NPS is inviting the Environmental Protection Agency to be a cooperating agency in the new EIS process to provide information in your areas of technical expertise, which will assist the NPS in making a more informed decision. The NPS will be inviting several other government agencies to participate in the development of the EIS as cooperating agencies including the California Coastal Commission, California Department of Fish and Game, National Marine Fisheries Service, Regional Water Quality Control Board, US Army Corps of Engineers, and US Fish and Wildlife Service.

A copy of this form letter offering the opportunity to participate as a cooperating agency also was sent to USACE, CCC, NMFS, USFWS, CDFG, and SF Bay RWQCB on the same date.

Please let us know by November 10, 2010 if you would like to participate as a Cooperating Agency in the development of the Drakes Bay Oyster Company Special Use Permit EIS by contacting Brannon Ketcham at Point Reyes National Seashore at (415) 464-5192 or by email at brannon_ketcham@nps.gov.

On October 8, 2010 the NPS announced the beginning of scoping for this EIS. The comment period will close 30 days from the publication of a Notice of Intent to Prepare an EIS in the Federal Register (anticipated for mid-October). Scoping allows the general public and interested groups and agencies the opportunity to participate early on in the range of alternatives and the issues to be considered for impact analysis as part of the EIS. It also gives them a chance to identify topics and concerns that should be addressed in the EIS. Finally it helps them bring forward any new information that the NPS may not be aware of that would be of useful in preparing the plan and EIS.

The National Park Service will be hosting three public meetings during the initial scoping phase of this process. The open house style meetings are intended to gather comments from the public that will be used in shaping the EIS. The meetings are scheduled for late October at the following locations:

Tuesday October 26, 2010, 6-8pm

Dance Palace Community Center
503 B Street
Point Reyes Station, CA

Wednesday October 27, 2010, 6-8 pm

Multi-Purpose Room, Bay Model Visitor Center
2100 Bridgeway
Sausalito, CA

Thursday October 28, 2010, 6-8 pm

Community Room, REI Berkeley
1338 San Pablo Avenue
Berkeley, CA

In addition, the NPS intends to convene a Cooperating Agency conference call during the public scoping period. We will be contacting Cooperating Agencies with meeting information. We anticipate that the discussions held during this meeting would be used to draft a Memorandum of Understanding (MOU) between our two agencies as to role and responsibilities of each.

If you have questions concerning the role of cooperating agencies, please contact Brannon Ketcham at (415) 464-5192. We appreciate your participation in this process.

Sincerely,

A handwritten signature in blue ink, appearing to read "Cicely A. Muldoon". The signature is fluid and cursive, with the first name being the most prominent.

Cicely A. Muldoon
Superintendent

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



November 9, 2010

Brannon Ketcham
Point Reyes National Seashore
Point Reyes Station, California 94956

**RE: Drakes Bay Oyster Company Special Use Permit EIS – Cooperating Agency
Invitation**

Dear Mr. Ketcham:

California Coastal Commission (Commission) staff received a letter from the National Park Service - Point Reyes National Seashore (NPS), dated October 14, 2010, which describes the intention of NPS to initiate the National Environmental Policy Act process and develop an Environmental Impact Statement (EIS) to evaluate the potential issuance of a Special Use Permit for commercial oyster operations within the Drakes Estero portion of Point Reyes National Seashore. This letter also extends an invitation to the Commission to formally participate as a cooperating agency in the development of this EIS.

Although Commission staff anticipates following the EIS development process closely and providing comments and input at appropriate opportunities, we respectfully decline this offer to participate as a cooperating agency. We will continue to be available to NPS staff to answer specific questions and offer clarification of relevant matters whenever NPS and other cooperating agencies determine that such input would be useful, however.

Thank you for your offer and please feel free to contact me at 415-904-5502 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Cass Teufel".

CASSIDY TEUFEL
Coastal Program Analyst

DOC129



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
 SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
 1455 MARKET STREET
 SAN FRANCISCO, CALIFORNIA 94103-1398

NOV 16 2010

RECEIVED	
Point Reyes National Seashore	
NOV 17 '10	
<input checked="" type="checkbox"/>	SUPT.
<input type="checkbox"/>	SCIENCE
<input type="checkbox"/>	SPEC. PK. USES
<input type="checkbox"/>	LAW ENFORC.
<input checked="" type="checkbox"/>	NAT. RES.
<input type="checkbox"/>	RANGE CONS.
<input type="checkbox"/>	FIRE MGT.
<input type="checkbox"/>	INTERR.
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<input type="checkbox"/>	CONTRACTING
<input type="checkbox"/>	PERSONNEL
<input type="checkbox"/>	PUDGET
<input checked="" type="checkbox"/>	CENTRAL FILES

Regulatory Division

SUBJECT: File Number 2010-00116N

Ms. Cicely Muldoon
 Superintendent
 Point Reyes National Seashore
 1 Bear Valley Road
 Point Reyes Station, California 94956

Dear Ms. Muldoon:

This is in regard to the proposed Drakes Bay Oyster Company Special Use Permit and the development of the associated Environmental Impact Statement, pertaining to on-going aquaculture activities associated with Drakes Bay Oyster Company operations in Tomales Bay, Marin County, California.

All proposed work and/or structures extending bayward or seaward of the line on shore reached by: (1) mean high water (MHW) in tidal waters, or (2) ordinary high water in non-tidal waters designated as navigable waters of the United States, must be authorized by the Corps of Engineers pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403). Additionally, all work and structures proposed in unfilled portions of the interior of diked areas below former MHW must be authorized under Section 10 of the same statute.

All proposed discharges of dredged or fill material into waters of the United States must be authorized by the Corps of Engineers pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. Section 1344). Waters of the United States generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands.

The aquaculture activities are within our jurisdiction and a permit is required. Review of our files indicates that the Drakes Bay Oyster Company aquaculture operation does not have a current permit application or permit on file. The Corps advises that the Drakes Bay Oyster Company submit a permit application to ensure their activities comply with our regulations. Application for Corps authorization should be made to this office.

Drakes Bay Oyster Company should note that upon receipt of a properly completed application and plans, it may be necessary to advertise the work by issuing an agency comment solicitation letter or public notice for a period of 30 days.

DOC129

-2-

If an individual permit is required, it will be necessary for Drakes Bay Oyster Company to demonstrate to the Corps that any proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines.

Nationwide Permit 48 for *Existing Commercial Shellfish Aquaculture Activities* authorizes certain activities provided specified conditions are met. A completed application will enable us to determine whether the activities are already authorized.

The Corps also suggests that Drakes Bay Oyster Company contact the Regional Water Quality Control Board, California Coastal Commission, and appropriate California Department of Fish and Game Office to ensure they review the project relative to their permitting requirements for activities that may impact aquatic resources.

We appreciate the opportunity to provide comments on the Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement (EIS) and accept the National Park Service invitation to act as a cooperating agency in the preparation of the EIS. Should you have any questions regarding this matter, please call Bryan Matsumoto of our Regulatory Division at 415-503-6786. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter.

Sincerely,



Jane M. Hicks
Chief, Regulatory Division

Copy Furnished:

NMFS, Santa Rosa, CA
US FWS, Sacramento, CA
RWQCB, Oakland, CA
CA Coastal Commission, San Francisco, CA (Attn: Cassidy Teufel)
CA DFG, Yountville, CA

DOC128



Arnold Schwarzenegger
Governor

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit



Cathleen Cox
Acting Director

Notice of Intent

November 17, 2010

To: Reviewing Agencies

Re: Special Use Permit for Commercial Oyster Operations within Drakes Estero at Point Reyes National Seashore

SCH# 2010104004

Attached for your review and comment is the Notice of Intent (NOI) for the Special Use Permit for Commercial Oyster Operations within Drakes Estero at Point Reyes National Seashore draft Environmental Impact Statement (EIS).

Responsible agencies must transmit their comments on the scope and content of the NOI, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOI from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Brannon Ketchan
National Park Service
1 Bear Valley Road
Point Reyes Station, CA 94956

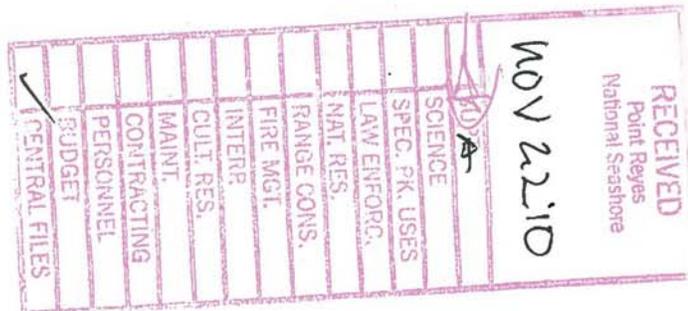
with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency



SCH# 2010104004
Project Title Special Use Permit Commercial Oyster Operations within Drakes Estero at Point Reyes National Seashore
Lead Agency National Park Service

Type NOI Notice of Intent
Description -Manage natural and cultural resources to support their maximum protection, restoration, and preservation.
 - Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
 - Engage a broad spectrum of the public and relevant agencies in the NEPA process.

Lead Agency Contact

Name Brannon Ketcham
Agency National Park Service
Phone 415-464-5192 **Fax**
email
Address Point Reyes National Seashore
City Point Reyes Station **State** CA **Zip** 94956

Project Location

County Marin
City
Region
Cross Streets
Lat / Long
Parcel No.

Township	Range	Section	Base
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Proximity to:

Highways
Airports
Railways
Waterways Drakes Bay and Pacific Ocean
Schools
Land Use National Parks

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Fiscal Impacts; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Growth Inducing; Landuse; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian

Reviewing Agencies Resources Agency; Department of Boating and Waterways; California Coastal Commission; Department of Fish and Game, Region 3; Department of Parks and Recreation; Department of Water Resources; Caltrans, District 4; Regional Water Quality Control Board, Region 1; Department of Toxic Substances Control; Native American Heritage Commission; State Lands Commission

Date Received 10/26/2010 **Start of Review** 10/26/2010 **End of Review** 11/24/2010

Note: Blanks in data fields result from insufficient information provided by lead agency.



United States Department of the Interior
FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825



November 17, 2010

Document Number: 101117042657

Cicely Muldoon, Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Subject: Species List for Drakes Bay Oyster Company Special Use Permit EIS

Dear: Ms. Muldoon

We are sending this official species list in response to your November 17, 2010 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be February 15, 2011.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found at www.fws.gov/sacramento/es/branches.htm.

Endangered Species Division

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office
Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested
 Document Number: 101117042657
 Database Last Updated: April 29, 2010

Quad Lists

Listed Species

Invertebrates

- Haliotes cracherodii*
black abalone (E) (NMFS)
- Haliotes sorenseni*
white abalone (E) (NMFS)
- Speyeria zerene myrtleae*
Myrtle's silverspot butterfly (E)
- Syncaris pacifica*
California freshwater shrimp (E)

Fish

- Eucyclogobius newberryi*
tidewater goby (E)
- Oncorhynchus kisutch*
coho salmon - central CA coast (E) (NMFS)
Critical habitat, coho salmon - central CA coast (X) (NMFS)
- Oncorhynchus mykiss*
Central California Coastal steelhead (T) (NMFS)
Central Valley steelhead (T) (NMFS)
Critical habitat, Central California coastal steelhead (X) (NMFS)
- Oncorhynchus tshawytscha*
California coastal chinook salmon (T) (NMFS)

Amphibians

- Rana draytonii*
California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

- Caretta caretta*
loggerhead turtle (T) (NMFS)
- Chelonia mydas (incl. agassizi)*
green turtle (T) (NMFS)
- Dermodochelys coriacea*

leatherback turtle (E) (NMFS)

Lepidochelys olivacea

olive (=Pacific) ridley sea turtle (T) (NMFS)

Birds

Brachyramphus marmoratus

Critical habitat, marbled murrelet (X)

marbled murrelet (T)

Charadrius alexandrinus nivosus

Critical habitat, western snowy plover (X)

western snowy plover (T)

Diomedea albatrus

short-tailed albatross (E)

Pelecanus occidentalis californicus

California brown pelican (E)

Sternula antillarum (=Sterna, =albifrons) browni

California least tern (E)

Strix occidentalis caurina

northern spotted owl (T)

Mammals

Arctocephalus townsendi

Guadalupe fur seal (T) (NMFS)

Balaenoptera borealis

sei whale (E) (NMFS)

Balaenoptera musculus

blue whale (E) (NMFS)

Balaenoptera physalus

finback (=fin) whale (E) (NMFS)

Eubalaena (=Balaena) glacialis

right whale (E) (NMFS)

Eumetopias jubatus

Steller (=northern) sea-lion (T) (NMFS)

Physeter catodon (=macrocephalus)

sperm whale (E) (NMFS)

Plants

Alopecurus aequalis var. *sonomensis*

Sonoma alopecurus (E)

Chorizanthe robusta var. *robusta*

robust spineflower (E)

Chorizanthe valida

Sonoma spineflower (E)

Layia carnosa

beach layia (E)

Lupinus tidestromii

clover lupine [Tidestrom's lupine] (E)

Proposed Species

Amphibians

Rana draytonii

Critical habitat, California red-legged frog (PX)

Quads Containing Listed, Proposed or Candidate Species:

DRAKES BAY (485C)

County Lists

Marin County

Listed Species

Invertebrates

Haliotes cracherodii

black abalone (E) (NMFS)

Haliotes sorenseni

white abalone (E) (NMFS)

Icaricia icarioides missionensis

mission blue butterfly (E)

Incisalia mossii bayensis

San Bruno elfin butterfly (E)

Speyeria zerene myrtleae

Myrtle's silverspot butterfly (E)

Syncaris pacifica

California freshwater shrimp (E)

Fish

Acipenser medirostris

green sturgeon (T) (NMFS)

Eucyclogobius newberryi

critical habitat, tidewater goby (X)

tidewater goby (E)

Oncorhynchus kisutch

coho salmon - central CA coast (E) (NMFS)

Critical habitat, coho salmon - central CA coast (X) (NMFS)

Oncorhynchus mykiss

Central California Coastal steelhead (T) (NMFS)
Critical habitat, Central California coastal steelhead (X) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha

California coastal chinook salmon (T) (NMFS)
Central Valley spring-run chinook salmon (T) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)

Rana draytonii

California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

Caretta caretta

loggerhead turtle (T) (NMFS)

Chelonia mydas (incl. agassizi)

green turtle (T) (NMFS)

Dermochelys coriacea

leatherback turtle (E) (NMFS)

Lepidochelys olivacea

olive (=Pacific) ridley sea turtle (T) (NMFS)

Birds

Brachyramphus marmoratus

Critical habitat, marbled murrelet (X)
marbled murrelet (T)

Charadrius alexandrinus nivosus

Critical habitat, western snowy plover (X)
western snowy plover (T)

Diomedea albatrus

short-tailed albatross (E)

Pelecanus occidentalis californicus
California brown pelican (E)

Rallus longirostris obsoletus
California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni
California least tern (E)

Strix occidentalis caurina
northern spotted owl (T)

Mammals

Arctocephalus townsendi
Guadalupe fur seal (T) (NMFS)

Balaenoptera borealis
sei whale (E) (NMFS)

Balaenoptera musculus
blue whale (E) (NMFS)

Balaenoptera physalus
finback (=fin) whale (E) (NMFS)

Eubalaena (=Balaena) glacialis
right whale (E) (NMFS)

Eumetopias jubatus
Critical Habitat, Steller (=northern) sea-lion (X) (NMFS)
Steller (=northern) sea-lion (T) (NMFS)

Megaptera novaeangliae
humpback whale (E) (NMFS)

Physeter catodon (=macrocephalus)
sperm whale (E) (NMFS)

Reithrodontomys raviventris
salt marsh harvest mouse (E)

Plants

Alopecurus aequalis var. *sonomensis*
Sonoma alopecurus (E)

Calochortus tiburonensis
Tiburon mariposa lily (T)

Castilleja affinis ssp. *neglecta*
Tiburon paintbrush (E)

Chorizanthe robusta var. *robusta*
robust spineflower (E)

Chorizanthe valida
Sonoma spineflower (E)

Delphinium bakeri
Baker's larkspur (E)
Critical habitat, Baker's larkspur (X)

Delphinium luteum
Critical habitat, yellow larkspur (X)
yellow larkspur (E)

Hesperolinon congestum
Marin dwarf-flax (=western flax) (T)

Layia carnosa
beach layia (E)

Lupinus tidestromii
clover lupine [Tidestrom's lupine] (E)

Streptanthus niger
Tiburon jewelflower (E)

Trifolium amoenum
showy Indian clover (E)

Proposed Species

Amphibians

Rana draytonii
Critical habitat, California red-legged frog (PX)

Key:

- (E) *Endangered* - Listed as being in danger of extinction.
- (T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
- (P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.
- Critical Habitat* - Area essential to the conservation of a species.
- (PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
- (C) *Candidate* - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environment documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that result in take, then that agency must engage in a formal [consultation](#) with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [Map Room](#) page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts [More info](#)

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be February 15, 2011.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Silver Spring, Maryland 20910

MAR 30 2011

Mr. Peter Douglas
Executive Director
California Coastal Commission
45 Fremont, Suite 2000
San Francisco, California 94105-5200

Re: Request of the California Coastal Commission to Review National Park Service Special Use Permit Application by Drakes Bay Oyster Company for Aquaculture Operations

Dear Mr. Douglas:

Thank you for the California Coastal Commission's (CCC) request to review an application by Drakes Bay Oyster Company (DBOC) to the National Park Service for a Special Use Permit within the Drake's Estero portion of Point Reyes National Seashore. CCC requested the National Oceanic and Atmospheric Administration (NOAA) Office of Ocean and Coastal Resource Management's (OCRM) approval to review the application as an unlisted "federal license or permit activity" under Section 307 of the Coastal Zone Management Act (CZMA)¹ and NOAA's implementing regulations at 15 C.F.R. § 930.54.

For the reasons stated below, OCRM approves the CCC's request to review the National Park Service Special Use Permit for federal consistency with the federally approved California Coastal Management Program, based on OCRM's determination that the activity, if permitted, would have a reasonably foreseeable effect on coastal uses or resources of the California coastal zone. Also, as discussed below, OCRM has determined that the threshold issues raised by DBOC are not persuasive. Therefore, DBOC must prepare and submit to the CCC a certification that the activity will be conducted consistent with the federally approved enforceable policies of the California Coastal Management Program, including the submission of necessary data and information required by 15 C.F.R. § 930.58. The National Park Service may not issue the Special Use Permit until either the CCC concurs with the consistency certification or the CCC's concurrence is presumed.² OCRM's approval of the CCC's request to review the Special Use Permit does not address whether the activity is consistent with the California Coastal Management Program. Rather, OCRM's approval merely authorizes the CCC's review under Section 307(c)(3)(A) of the CZMA and NOAA's regulations at 15 C.F.R. part 930, subpart D.

¹ 16 U.S.C. § 1456.

² The CCC's concurrence is presumed if the CCC does not respond within six months from receipt of the original Federal agency notice to the CCC or within 3 months from receipt of DBOC's consistency certification whichever period terminates last. 15 C.F.R. § 930.54(e).



BACKGROUND

States with federally approved coastal management programs list in their programs federal license or permit activities that are subject to the state's review under the federal consistency requirement of Section 307 of the CZMA.³ An "unlisted activity" is an activity that requires a federal license or permit, but is either: (1) not listed in the state's coastal management program; or (2) is listed, but the proposed project is located outside the state's coastal zone and the state has not described a geographical location outside its coastal zone where consistency applies.⁴ For unlisted activities in or outside the coastal zone, the state must notify the applicant, the relevant federal agency, and OCRM that it intends to review the activity. A state must make this notification within 30 days of receiving notice of the license or permit application; otherwise, a state waives its right to review the unlisted activity.⁵ The waiver does not apply where the state office charged with implementing an approved coastal management program does not receive notice of the application.

OCRM must either approve or decline to allow a state's review of an unlisted activity for consistency. The applicant and federal agency have fifteen days from receipt of a state's request to provide comments to OCRM. OCRM will make a decision usually within 30 days of receipt of a state's request, although NOAA's regulations allow for extensions.

In reviewing a state's request to review an unlisted activity, the sole basis for OCRM's decision will be whether the proposed activity will have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone.⁶ The federal agency may not authorize the activity unless OCRM denies the state's request or, if OCRM approves the state's request, the state concurs with the applicant's consistency certification.⁷ If the state objects to the consistency certification and the applicant appeals the state's objection to the Secretary of Commerce, pursuant to 15 C.F.R. Part 930, subpart H, and the Secretary overrides the state's objection, then the federal agency may authorize the activity.

THE CCC'S REQUEST TO REVIEW DBOC'S SPECIAL USE PERMIT APPLICATION AS AN UNLISTED ACTIVITY

DBOC has applied to the National Park Service for a Special Use Permit to extend its existing aquaculture operation for ten years, taking effect on November 30, 2012. A special use permit for aquaculture operations is not listed by the CCC in the California Coastal Management Program as a federal license or permit activity requiring consistency review. Therefore, to review the permit application as an unlisted activity, the CCC must obtain OCRM's approval in accordance with 15 C.F.R. § 930.54. That regulation requires that, in order to approve the CCC's request, OCRM must find that the license or permit activity would have reasonably foreseeable effects on any coastal resources or uses of the state's coastal zone.⁸

³ See 16 U.S.C. § 1456(c)(3)(A); 15 C.F.R. § 930.53(a).

⁴ See 15 C.F.R. §§ 930.53, 930.54.

⁵ 15 C.F.R. § 930.54(a)(1).

⁶ 15 C.F.R. § 930.54(c).

⁷ 15 C.F.R. § 930.54(d).

⁸ 15 C.F.R. § 930.54(c).

On October 12, 2010, the CCC received a letter from Point Reyes National Seashore Park Superintendent Cicely Muldoon stating that the National Park Service was beginning the preparation of an environmental impact statement (EIS) to evaluate the potential issuance of a Special Use Permit for extending the operations of DBOC. OCRM received the CCC's unlisted activity request on November 10, 2010.⁹ The CCC met the requirement of 15 C.F.R. § 930.54(c) that a state's request to review an unlisted activity review be made with OCRM within 30 days of notice of the permit application.¹⁰ OCRM extended its review period to April 1, 2011, pursuant to 15 C.F.R. § 930.54(c).

In order to review the National Park Service's issuance of the Special Use Permit to DBOC, the CCC must show that the Special Use Permit has reasonably foreseeable effects on any coastal resources or uses of the California coastal zone. The CCC's request to OCRM to review the Special Use Permit alleges the following reasonably foreseeable coastal effects:

- Reduction in eelgrass coverage due to shading from oyster racks and changes in substrate composition;
- Loss of eelgrass due to propeller cuts and anchor placement/removal associated with the use of motorized aquaculture vessels;
- Large scale filtration of estero waters and removal of plankton by non-native cultivated shellfish;
- Reduction in shorebird foraging habitat through the use of intertidal areas for the placement of bottom culture shellfish bags;
- Introduction, spread, and propagation of invasive species; and
- Disturbances to harbor seals due to the operation of motorized vessels and the placement, maintenance, and removal of oyster and clam grow-out bags in inter-tidal sand bar areas.¹¹

Comments on the CCC's request were received from the National Park Service, Corey S. Goodman, Ph.D., Drakes Bay Oyster Company, the U.S. Department of the Interior's Office of the Solicitor, the National Parks Conservation Association, Environmental Action Committee of West Marin County, and the Alliance for Sustainable Agriculture. The CCC supplemented its initial findings of reasonably foreseeable effects,¹² and DBOC supplemented its response with additional information.¹³

DBOC's comments in opposition to the CCC's request assert the following arguments:

⁹ Letter from Peter Douglas, Executive Director, CCC, to Donna Wieting, Acting Director, OCRM (Nov. 10, 2011).

¹⁰ See 15 C.F.R. § 930.54(c).

¹¹ Letter from Peter Douglas, Executive Director, CCC, to Donna Wieting, Acting Director, OCRM (Nov. 10, 2011).

¹² Letter from Peter Douglas, Executive Director, CCC, to Donna Wieting, Acting Director, OCRM (Jan. 13, 2011).

¹³ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM (Jan 13, 2011).

1. That under the provisions of Pub. L. 111-88, the CCC cannot review DBOC's application for a Special Use Permit for federal consistency under the CZMA. DBOC asserts there can be no interference with the Secretary of the Interior's discretion to approve or deny the DBOC Special Use Permit authorized by Pub. L. 111-88, and that federal consistency review could jeopardize the timeline set forth in Pub. L. 111-88.¹⁴
2. The CCC's request to review the activity is inconsistent with the provisions of the Marin County Local Coastal Program that governs the area where DBOC operates.¹⁵
3. The appropriate baseline for determining whether the Special Use Permit has reasonably foreseeable coastal effects includes DBOC's existing operations, so that OCRM's review is limited to whether new operations, not existing operations, will have reasonably foreseeable coastal effects. DBOC also contends that the CCC has failed to demonstrate new coastal effects from DBOC's new operations.¹⁶
4. The CCC failed to demonstrate that there are reasonably foreseeable coastal effects from the activities that would be authorized by the Special Use Permit, in part because of the CCC's reliance on flawed science in its request to OCRM.¹⁷

RESPONSE TO COMMENTS

As discussed below, each of DBOC's arguments to the CCC's request lacks merit. The CCC's ability to request review of the Special Use Permit under the CZMA, and OCRM's authority to consider the CCC's request, were not affected by Congress's grant of discretionary authority to issue a permit to DBOC; the Marin County Local Coastal Program also does not restrict the CCC's authority to review the Special Use Permit; the CZMA and NOAA's implementing regulations are not limited to new coastal effects; and the CCC has met its burden to demonstrate that the Special Use Permit will have reasonably foreseeable effects on the uses or resources of the California coastal zone.

1. *Public Law 111-88*

DBOC argues that its proposal for a Special Use Permit is not subject to federal consistency review by the CCC, based upon legislation enacted in 2009 authorizing the Department of the Interior to issue the Permit "notwithstanding any other provision of law." Section 124 of the Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010, provides as follows:

Prior to the expiration on November 30, 2012 of the Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit ("existing

¹⁴ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 2-4 (Dec. 1, 2010).

¹⁵ *Id.* at 5.

¹⁶ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 3-4 (Jan 13, 2011).

¹⁷ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 6-9 (Dec. 1, 2010).

*authorization”) within Drake’s Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012; Provided, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. Nothing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore.*¹⁸

According to both DBOC and the National Park Service, this legislation was in response to limitations on the Service’s ability to authorize the continued operation of the DBOC facility beyond November 30, 2012. Specifically, the National Park Service had taken the position that once the Reservation of Use and Occupancy Agreement expired on November 30, 2012, continued authorization of DBOC’s activities in Drakes Estero was not permissible under the Point Reyes Wilderness Act, Wilderness Act, National Park Service Organic Act, and applicable National Park Service Management Policies.¹⁹

In response, Congress enacted Section 124 of the 2010 Appropriations Act for the Department of the Interior. This provision was first offered as an amendment by Senator Dianne Feinstein, during consideration of the bill by the Senate Committee on Appropriations. As initially proposed, the Secretary of the Interior was “directed” to extend the existing authorization for an additional 10 years.²⁰ Senator Feinstein later offered an amendment to this language when the bill reached the Senate floor for consideration. The amendment, which passed by voice vote, closely approximated the version that ultimately became law and provided that the Secretary of the Interior is “authorized” to issue a new 10 year permit.²¹ The final version was agreed to in Conference without significant changes. The Conference Report noted, however, that the final language modified language included by the Senate, “providing the Secretary with discretion to issue a special use permit to Drake’s Bay Oyster Company....”²²

Whether CZMA review is allowed depends upon the reach of the phrase “notwithstanding any other provision of law,” within Section 124. Case law suggests that the reach of such language varies. Consideration must be given to whether Congress intended the phrase to require a federal agency to disregard all otherwise applicable laws.²³ Typically, such language serves to supersede only “conflicting” statutes. Additionally, when two statutes are capable of

¹⁸ Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010, Pub. L. 111-88, 123 Stat. 2904, 2932 (Oct. 30, 2009).

¹⁹ National Park Service, *Clarification of Law, Policy and Science on Drakes Estero* (Sept. 18, 2007) (unpublished white paper).

²⁰ S. Rep. No. 111-38 at 27 and 48 (2009).

²¹ Cong. Rec. S9773 (Sept. 24, 2009).

²² Conf. Rep. No. 111-316 at 107 (Oct. 28, 2009).

²³ *Oregon Natural Resources Council v. Thomas*, 92 F.3d 792, 797 (9th Cir. 1996).

coexistence, courts will regard each as effective and limit any finding of implied repeal to the minimum extent necessary.²⁴

In light of established rules of statutory construction and the legislative history of Section 124, OCRM does not believe that Section 124 bars the CCC from reviewing the permit application for federal consistency. This interpretation is consistent with the plain language of the statute. The statute does not mandate issuance of a permit. Rather, it simply “authorizes” the National Park Service to issue a new permit if, in the exercise of its discretion, it chooses to do so. That discretion is informed by other environmental reviews conducted under other statutes. To eliminate the application of these statutes, including the CZMA, would deprive the National Park Service of the information it would need to make an informed decision. This interpretation avoids the implied repeal of other applicable statutes, allowing relevant statutes such as the CZMA to have continued application.

This interpretation is also consistent with the legislative history giving rise to this provision, both as set forth in the evolution of the statute and as expressly understood by both the National Park Service and DBOC. Section 124 responds to the National Park Service’s belief that it lacked the authority to authorize the continued operation of the facility under the Point Reyes Wilderness Act, Wilderness Act, National Park Service Organic Act, and applicable National Park Service Management Policies. The purpose of the legislation was to vest the Park Service with the authority to issue a new permit, notwithstanding these existing authorities.

Finally, this interpretation is consistent with the actions of both DBOC and the National Park Service, subsequent to the enactment of Section 124. In correspondence with OCRM, the National Park Service has indicated that, in its view, federal consistency review is required on the permit, notwithstanding Section 124. Regarding the application of other environmental requirements, the National Park Service has determined that its review of the permit application is subject to the requirements of the National Environmental Policy Act (NEPA). DBOC has tacitly concurred, and is preparing the appropriate environmental analyses.

DBOC asserts that the granting of approval to the CCC to review its application for a Special Use Permit could create a timeline conflict with the statutorily mandated term of authorization for the Special Use Permit specified in Section 124, which states that the Permit may begin on November 30, 2012. Although the State’s federal consistency reviews must be completed within six months of the submission of a consistency certification,²⁵ DBOC asserts that the CZMA six-month review timeline could still cause the November 30, 2012, issue date for the Special Use Permit to be missed if the CCC delays the start of the CZMA time clock by requiring that DBOC first submit the environmental impact statement developed under the NEPA as “necessary data and information.”²⁶

²⁴ *In re Glacier Bay*, 944 F.2d 577, 582 (9th Cir. 1991) (quoting *Radzanower v. Touche Ross & Co.*, 426 U.S. 148, 155 (1976); *Silver v. New York Stock Exchange*, 373 U.S. 341, 357 (1963)).

²⁵ See 15 C.F.R. § 930.62(a).

²⁶ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 4 (Dec. 1, 2010).

OCRM finds that DBOC's timeline argument is without merit. DBOC's argument about the potential delay that could occur if the CCC requires that DBOC submit the environmental impact statement as part of the federal consistency review is unfounded because NEPA documents are not included in the CCC's list of "necessary data and information" as part of the California Coastal Management Program. In order for the CCC to delay the start of the CZMA time clock by requiring the submission of a NEPA documents as "necessary data and information," the CCC would have to have those specific information requirements as part of the California Coastal Management Program.²⁷ Moreover, while the review timeframe under the CZMA is independent of other federal statutes, including Section 124, it would not constrain the Secretary of the Interior from completing the review of the application for the Special Use Permit. The Secretary could issue the permit conditioned upon the completion of other federal requirements. This is something that federal permitting agencies frequently do, and this practice is consistent with the CZMA and NOAA's implementing regulations.

2. *Marin County Local Coastal Program*

DBOC argues that the Marin County Local Coastal Program governs the area that would be subject to the Special Use Permit, and that the local coastal program precludes the CCC's review. The local program states: "Existing mariculture operations are encouraged and should be permitted to continue in the parks. . . . *New* mariculture activities should be subject to review by the Coastal Commission."²⁸ According to DBOC, the local coastal program removes the CCC's ability to review its Special Use Permit because it is not a "new" mariculture operation.

OCRM finds that DBOC has misconstrued the delineation of authority between local coastal programs and the CCC. While the certification of local coastal programs provides those programs with exclusive permitting authority for certain types of activities, nothing in the California Coastal Management Program confers authority on local programs to conduct federal consistency reviews. Nor do the local programs determine the scope of the CCC's federal consistency authority. The CCC retains that exclusive authority for federal consistency and does not rely on local plan policies for its reviews.²⁹

3. *Environmental Baseline*

DBOC argues that in evaluating the CCC's request to review the Special Use Permit as an unlisted activity OCRM may only consider whether *new* coastal effects are reasonably foreseeable.³⁰ Coastal effects resulting from existing operations are, according to DBOC, inappropriate in determining whether the Special Use Permit will have reasonable foreseeable coastal effects. In making this argument, DBOC notes that its operations

²⁷ See 15 C.F.R. § 930.58.

²⁸ Marin County Local Program, Unit II amended, p.62 (Dec. 9, 1980) (emphasis added).

²⁹ Letter from Peter Douglas, Executive Director, CCC, to Charles Ehler, Acting Director, OCRM 1 (May 12, 2002).

³⁰ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 3 (Jan 13, 2011).

have been conducted since the 1930s, and that the Special Use Permit would have the effect of reauthorizing its existing authorization, which is about to expire, and would not authorize DBOC to conduct new operations. DBOC contends that OCRM is required to establish a “baseline” against which to measure the alleged impacts of the proposed activity, and that the assessment of reasonably foreseeable effects must be limited to those which go beyond existing operations.³¹ DBOC further claims that the CCC “has not carried forward its burden to identify *any* new coastal effects.”³²

OCRM disagrees. The term “coastal effects,” as defined in NOAA’s regulations, means: “*any* reasonably foreseeable effect on *any* coastal use or resource.”³³ The term includes: “both direct effects which result from the activity and occur at the same time and place as the activity, and indirect (cumulative and secondary) effects which result from the activity and are later in time or farther removed in distance but are still reasonably foreseeable.”³⁴ “Indirect effects” include those “resulting from the incremental impact of the activity when added to other past, present, and reasonably foreseeable actions regardless of what person(s) undertake(s) such actions.”³⁵ Thus, NOAA’s regulations explicitly require consideration of all coastal effects, not simply future effects. As a result, there is no requirement to establish an environmental baseline from which new effects must be determined.

4. *Reasonably Foreseeable Coastal Effects*

Finally, DBOC argues that the CCC has failed to demonstrate that the Special Use Permit has any reasonably foreseeable coastal effects.

DBOC first alleges that the CCC has applied the incorrect standard in determining effects.³⁶ Rather than considering “reasonably foreseeable” coastal effects as required under NOAA regulations, the CCC purportedly uses a different standard, examining whether coastal effects resulting from the Special Use Permit are “reasonably expected” and result in “potentially significant impacts.” Although the CCC did not use the same phrasing as that used in NOAA’s regulations, it is more importantly relevant that OCRM will employ the regulatory standard of reasonable foreseeable coastal effects regardless of the terminology used by the CCC. Under the CZMA and NOAA’s regulations, if there are any reasonably foreseeable coastal effects, then there is authority for federal consistency review by the CCC.

DBOC also contends that the CCC has failed to demonstrate reasonably foreseeable coastal effects because its analysis is based on scientific claims that have been disproven, discredited, or withdrawn. According to DBOC, the claims made by the CCC regarding coastal effects are based on flawed information that has been withdrawn based on a

³¹ *Id.*

³² *Id.* at 3-4 (emphasis in original).

³³ 15 C.F.R. § 930.11(g) (emphasis added).

³⁴ *Id.*

³⁵ *Id.*

³⁶ Letter from Kevin and Nancy Lunny, DBOC, to Dr. Jane Lubchenco, Administrator, NOAA, and Donna Wieting, Acting Director, OCRM 6 (Dec. 1, 2010).

National Academy of Sciences (NAS) review of scientific information used by the National Park Service.³⁷ DBOC's argument is based on the findings of the NAS,³⁸ which in many respects are in sharp contrast to the assertions made by the CCC.

OCRM agrees that parts of the CCC's original request were predicated upon discredited information. Not only did the NAS reach conclusions contrary to some of those presented by the CCC, it also discredited the sources that the CCC relies on. However, OCRM also finds that DBOC's criticism is incomplete, and fails to adequately address all all coastal effects asserted by the CCC.

In examining the CCC's request, OCRM considers whether there are reasonably foreseeable effects to uses or resources of the California coastal zone from the authorized activity. As explained previously, NOAA's regulations define the term "coastal effects" broadly to mean "any reasonably foreseeable effect on any coastal use or resource" and to "include both direct effects which result from the activity and occur at the same time and place as the activity, and indirect (cumulative and secondary) effects which result from the activity and are later in time or farther removed in distance, but are still reasonably foreseeable."³⁹ The term "any coastal use or resource" includes:

public access, recreation, fishing, historic or cultural preservation, development, hazards management, marinas and floodplain management, scenic and aesthetic enjoyment, and resource creation or restoration projects...biological or physical resources that are found within a State's coastal zone on a regular or cyclical basis...air, tidal and nontidal wetlands, ocean waters, *estuaries*, rivers, streams, lakes, aquifers, submerged aquatic vegetation, land, plants, trees, minerals, fish, shellfish, invertebrates, amphibians, birds, mammals, reptiles, and coastal resources of national significance.⁴⁰

It is important to note that the significance of coastal effects is not determinative; the CCC only needs to show that any coastal effect is reasonably foreseeable. OCRM finds that there are reasonably foreseeable coastal effects associated with the mariculture operations that would be authorized under the Special Use Permit for DBOC. The NAS report, which DBOC relies on in refuting the CCC, states:

Oyster mariculture necessarily has ecological consequences in Drakes Estero as in other lagoons and estuaries, the magnitude and significance of which vary with the intensity of the culturing operations. These effects derive from two different sources: the presence of and biological activity of the oysters and the activities of the culturists.⁴¹

³⁷ *Id.* at 6-7.

³⁸ See The National Academy of Sciences, *Shellfish Mariculture in Drakes Estero* (2009).

³⁹ 15 C.F.R. § 930.11(g).

⁴⁰ 15 C.F.R. § 930.11(b) (emphasis added).

⁴¹ The National Academy of Sciences, *Shellfish Mariculture in Drakes Estero*, at p. 2 (2009). It is noted that DBOC has previously acknowledged these effects from its operations. Included in DBOC's response to the CCC's unlisted activity review request is Attachment J, a November 14, 2008, letter from Kevin Lunny to the CCC regarding a Consent Cease & Desist Order, which provides information as to how DBOC addresses various effects

In addition to the more easily determined coastal effects that would result from mariculture operations in an estuary—including the basic effect on the estuary itself and the company’s activities, both of which satisfy the regulatory standard—the CCC has provided an evidentiary basis for concluding that there is at least one reasonably foreseeable negative environmental impact from DBOC’s activities.⁴² Specifically, OCRM finds that the introduction, spread, and propagation of invasive species is a reasonably foreseeable coastal effect. The NAS found that the oysters and clams cultured in Drakes Estero are nonnative species that have some risk of establishing self-sustaining populations. Although the oyster farm imports larvae and spat that meet certification requirements as specific-pathogen free, that does not eliminate the possibility of the transmission of pathogens. The shells, racks and other structures used in the mariculture operations already serve as hard surfaces that would not otherwise be available for a nonnative invasive tunicate, which increases the potential for the spreading of this invasive species.⁴³

Therefore, OCRM finds that the risk associated with the use of nonnative species in the estuary is sufficient for the CCC to establish that there is a reasonably foreseeable effect on the coastal resources and uses of the California coastal zone.

CONCLUSION

OCRM approves the CCC’s request to review, for consistency with its federally approved California Coastal Management Program, the National Park Services’s Special Use Permit for DBOC’s operations in Drake’s Estero. DBOC’s arguments regarding limitations on the CCC’s authority to review the Special Use Permit are unpersuasive. OCRM also finds that there are reasonably foreseeable coastal effects associated with the mariculture operations that would be authorized under the Special Use Permit for DBOC. As such, the CCC’s request for approval to review the Special Use Permit application of DBOC is granted.

Please direct any questions in regards to this matter to David Kaiser, OCRM Senior Policy Analyst, at David.Kaiser@noaa.gov 603-862-2719; or Kerry Kehoe, OCRM Federal Consistency Specialist, at Kerry.Kehoe@noaa.gov 301-563-1151.

Sincerely,



Donna Wieting
Acting Director
Office of Ocean and Coastal Resource Management

associated with the mariculture operations.

⁴² It is important to reiterate that a negative environmental impact is not necessary to find a reasonably foreseeable coastal effect under the CZMA and NOAA’s regulations.

⁴³The National Academy of Sciences, *Shellfish Mariculture in Drakes Estero*, at p. 5 (2009).

cc: Kevin Lunny, DBOC
Cicely Muldoon, NPS



United States Department of the Interior

NATIONAL PARK SERVICE
Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

H4217

April 1, 2011

Ms. Jenan Saunders
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Re: Notification of intent to use National Environmental Policy Act (NEPA) process to meet §106 Obligations at Pt. Reyes National Seashore

Dear Ms. Saunders,

The National Park Service (NPS) was directed by the Secretary of the Interior to complete a NEPA process before the Secretary makes a decision whether to issue a 10-year Special Use Permit to the Drakes Bay Oyster Company, in Point Reyes National Seashore, after their current permit expires on Nov. 30, 2012. The NPS is preparing an Environmental Impact Statement (EIS), which will be released for public review in the fall of 2011.

The NPS intends to utilize the process and documentation required for preparation of the EIS to comply with §106 of the National Historic Preservation Act (NHPA). In accordance with section 800.8(c) of Advisory Council on Historic Preservation (ACHP) regulations for Section 106 of the NHPA (36 CFR Part 800), NPS is hereby notifying your office in advance of our intention to use the EA to meet our Section 106 obligations. By copy of this letter, NPS is also notifying the ACHP of this intent.

We appreciate working with you on the protection of cultural resources in Point Reyes National Seashore. If you have any questions regarding this project, please call me at (415) 464-5127.

Sincerely,

A handwritten signature in black ink, appearing to read "Gordon White", with a long horizontal flourish extending to the right.

Gordon White, Chief of Cultural Resources

cc:
Advisory Council on Historic Preservation



United States Department of the Interior

NATIONAL PARK SERVICE

Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

H4217

April 5, 2011

Ms. Jenan Saunders
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Re: Request for Concurrence, Determination of Eligibility of Johnson's Oyster Company (aka Drake's Bay Oyster Co.), Pt. Reyes National Seashore

Dear Ms. Saunders,

The National Park Service (NPS) was directed by the Secretary of the Interior to complete a NEPA process before the Secretary makes a decision whether to issue a 10-year Special Use Permit to the Drakes Bay Oyster Company, in Point Reyes National Seashore, after their current permit expires on Nov. 30, 2012. The NPS is preparing an Environmental Impact Statement (EIS), which will be released for public review in the fall of 2011.

Pursuant to the requirements of the National Historic Preservation Act (NHPA), the NPS has completed a determination of eligibility for the Oyster Company site on the shore of Drake's Estero and growing beds in the Estero itself. Based on this evaluation we have found that while the oyster-growing facility is significantly associated with the rebirth and development of the California oyster industry in the 1930's, the property is ineligible for listing in the National Register because it lacks historic integrity. Please find enclosed the National Register form, which provides the necessary information supporting this conclusion.

We request your concurrence with this finding of ineligibility. If you have any questions regarding this project, please call me at (415) 464-5127.

Sincerely,

Gordon White, Chief of Cultural Resources

enclosure:

National Register of Historic Places Registration Form – Johnson Oyster Company



Preserving America's Heritage

April 18, 2011

Mr. Gordon White
 Cultural Resources Chief
 Point Reyes National Seashore
 National Park Service
 Point Reyes, California 94956

Ref: Renewal of Special Use Permit to the Drakes Bay Oyster Company

Dear Mr. White:

On April 12, 2011, the Advisory Council on Historic Preservation (ACHP) received the National Park Service's (NPS) notification pursuant to Section 800.8(c) of the ACHP's regulations, "Protection of Historic Properties" (36 CFR Part 800). We appreciate receiving your notification, which establishes that NPS will use the process and documentation required for the preparation of an EIS/ROD to comply with Section 106 of the National Historic Preservation Act in lieu of the procedures set forth in 36 CFR 800.3 through 800.6.

In addition to notification to the ACHP, NPS must also notify the California State Historic Preservation Officer (SHPO) and meet the standards in Section 800.8(c)(1)(i) through (v) for the following:

- identify consulting parties either pursuant to 800.3(f) or through the NEPA scoping process with results consistent with § 800.3(f);
- identify historic properties and assess the effects of the undertaking on such properties in a manner consistent with the standards and criteria of § 800.4 through 800.5;
- consult regarding the effects of the undertaking on the qualifying characteristics of historic properties with the SHPO/THPO, Indian tribes, other consulting parties and the Council;
- involve the public; and
- develop in consultation with identified consulting parties alternatives and proposed measures that might avoid, minimize or mitigate any adverse effects of the undertaking on historic properties and describe them in the EA.

To meet the requirement to consult with the ACHP as appropriate, the NPS should notify the ACHP in the event NPS determines, in consultation with the SHPO, Indian tribes, and other consulting parties, that the proposed undertaking may adversely affect properties listed, or eligible for listing, on the National Register of Historic Places (historic properties).

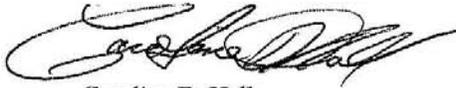
ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
 Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

In addition, Section 800.8(c)(2)(i) requires that you submit to the ACHP any DEIS or EIS you prepare. Inclusion of your adverse effect determination in both the DEIS/EIS and in your cover letter transmitting the DEIS/EIS to the ACHP will help ensure a timely response from the ACHP regarding its decision to participate in consultation. Please indicate in your cover letter the schedule for Section 106 consultation and a date by which you require a response by the ACHP.

Thank you for your notification pursuant to Section 800.8(c). If you have any questions or if we may be of assistance, please contact Katry Harris at 202-606-8520, or via e-mail at kharris@achp.gov.

Sincerely,



Caroline D. Hall
Assistant Director
Office of Federal Agency Programs
Federal Property Management Section



United States Department of the Interior

NATIONAL PARK SERVICE

Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617
(DBOC SUP EIS)

June 2, 2011

Timothy Ragen, Executive Director
Marine Mammal Commission
4340 East West Highway, Room 700
Bethesda, Maryland 20814-4498

Dear Mr. ^{Tim}Ragen:

The National Park Service (NPS) has initiated the preparation of an Environmental Impact Statement (EIS) to evaluate a potential issuance of a Special Use Permit for commercial oyster operations within Drakes Estero at Point Reyes National Seashore. Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a special use permit for a period of 10 years to Drakes Bay Oyster Company (DBOC) for commercial harvesting and processing of shellfish at Point Reyes National Seashore. The existing Reservation of Use and Occupancy and associated special use permit held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing permit.

On behalf of the Secretary, the NPS will use the National Environmental Policy Act (NEPA) process to engage the public and evaluate the effects of continuing the commercial operation within the national park. The results of the NEPA process will be used to inform the decision of whether a new special use permit should be issued to DBOC for a period of 10 years.

In accordance with the NEPA PL 91-190 USC 4321, and the Council of Environmental Quality (CEQ) Regulations Section 1501.5 and 1501.6, the NPS is inviting the Marine Mammal Commission to be a cooperating agency in the EIS process to provide information in your areas of technical expertise, which will assist the NPS in making a more informed decision. The NPS has entered into a Cooperating Agency Agreement with several other government agencies that indicated their intent to participate in the development of the EIS as cooperating agencies including the California Department of Fish and Game, Environmental Protection Agency, NOAA-National Marine Fisheries Service, and US Army Corps of Engineers.

The NPS announced initial scoping for the project on October 8, 2010. At that time, three public open houses were announced to provide opportunity for the public to learn more about the project and provide comments. The comment period closed on November 26, 2010 after 50 days. Over 4,000 pieces of correspondence were received during public scoping. On January 31, 2011, the NPS posted all public comment analysis report and all individual comments on line at:

http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_scoping_comments.htm

Please let us know if you would like to participate as a Cooperating Agency in the development of the Drakes Bay Oyster Company Special Use Permit EIS. Enclosed is a copy of the executed Cooperating Agency Agreement for your consideration. If the Marine Mammal Commission wishes to participate as a cooperating agency, we would add a section specific to the roles for your organization regarding the review. If you have questions concerning the role of cooperating agencies, please contact Brannon Ketcham at (415) 464-5192. We appreciate your participation in this process.

Sincerely,



Cicely A. Muldoon
Superintendent

Enclosure



United States Department of the Interior

NATIONAL PARK SERVICE
Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:
H4217

JUL 08 2011

Milford Wayne Donaldson, FAIA, LEED AP
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Re: Request for Concurrence, Determination of Eligibility of Johnson's Oyster Company (aka Drake's Bay Oyster Co.), Pt. Reyes National Seashore

Dear Mr. Donaldson,

The National Park Service (NPS) is preparing an Environmental Impact Statement (EIS) to evaluate a potential issuance of a Special Use Permit for commercial oyster operations within Drakes Estero at Point Reyes National Seashore. Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a special use permit for a period of 10 years to Drakes Bay Oyster Company (DBOC). The existing Reservation of Use and Occupancy and associated special use permit held by DBOC will expire on November 30, 2012. The NPS is planning to release the Draft Environmental Impact Statement for public review in the fall of 2011.

Pursuant to the requirements of the National Historic Preservation Act, the NPS completed a determination of eligibility (DOE) for the Oyster Company site on the shore of Drake's Estero and growing beds in the Estero itself. The DOE found that while the oyster-growing facility is significantly associated with the rebirth and development of the California oyster industry in the 1930's, the property is ineligible for listing in the National Register because it lacks historic integrity. We forwarded the DOE to your office on April 5, 2011. Based on comments received from Mr. Mark Beason in a telephone call, edits were made to the DOE. The updated DOE is enclosed.

We request your concurrence with this finding of ineligibility. If you have any questions regarding this project, please contact Chief of Cultural Resources Gordon White at (415) 464-5127.

Sincerely,



ACTING SUPT.

Cicely Muldoon
Superintendent

enclosure:
National Register of Historic Places Registration Form – Johnson Oyster Company

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov



August 4, 2011

Reply in Reference To: NPS110411A

Cicely Muldoon
Superintendent
National Park Service
Point Reyes National Seashore
Point Reyes, California 94956

Re: Request for Concurrence, Determination of Eligibility of Johnson's Oyster Company (aka Drake's Bay Oyster Co.), Point Reyes National Seashore

Dear Ms. Muldoon:

Thank you for your letter dated July 8, 2011, requesting my comment and concurrence for the Determination of Eligibility for Johnson's Oyster Company (aka Drake's Bay Oyster Co.) within the boundaries of Point Reyes National Seashore. Along with your letter, you submitted National Register of Historic Places (NRHP) Registration Form (undated) that provides the context and evaluation for this property.

Through this evaluation, NPS concludes that while Johnson's Oyster Company appears to be significant under NRHP Criterion A, it lacks historic integrity. Therefore, the property is not eligible for listing on the NRHP. After reviewing this determination of eligibility, I concur that the property is not eligible for listing on the NRHP.

Thank you for seeking my comments and considering historic properties as part of your planning. If you have any questions or concerns, please contact Mark Beason, Project Review Unit historian, at (916) 445-7047 or mbeason@parks.ca.gov.

Sincerely,

A handwritten signature in cursive script that reads "Susan K Stratton for".

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer



United States Department of the Interior

NATIONAL PARK SERVICE

Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

H4217

AUG 10 2011

Dr. Greg Sarris
Tribal Chairman
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: Notification of intent to use National Environmental Policy Act (NEPA) process to meet §106 Obligations at Point Reyes National Seashore (PRNS)

Dear Chairman Sarris,

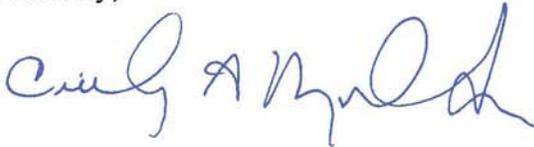
The National Park Service (NPS) is preparing an Environmental Impact Statement (EIS) to evaluate a potential issuance of a Special Use Permit for commercial oyster operations within Drakes Estero at PRNS. Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a special use permit for a period of 10 years to Drakes Bay Oyster Company (DBOC). The existing Reservation of Use and Occupancy and associated special use permit held by DBOC will expire on November 30, 2012. The NPS is planning to release the Draft EIS for public review in the fall of 2011.

The NPS intends to utilize the process and documentation required for preparation of the EIS to comply with §106 of the National Historic Preservation Act (NHPA). In accordance with section 800.8(c) of Advisory Council on Historic Preservation (ACHP) regulations for §106 of the NHPA (36 CFR Part 800), NPS is hereby notifying you in advance of our intention to use the EIS to meet our §106 obligations. We look forward to engaging in a formal §106 consultation with the Tribe resulting in a thoughtful review of the draft EIS during the public comment period this fall.

Over the last few months we have communicated several times with Tribal representative Nick Tipon, keeping him apprised of the status of the EIS. Nick has assisted contractors with archaeological site surveys on the Estero, and on July 14 we briefed Nick in a meeting at the Seashore on the status of alternatives and proposed avoidance measures related to FIGR cultural resources.

We continue to enjoy an excellent working relationship with Nick, and appreciate the thoughtful assistance we receive from him on cultural resource issues. Thank you again for your continued interest in and commitment to preserving the Tribe's ancestral homelands in the Seashore. If you have any questions regarding this project, please contact Gordon White, Chief of Cultural Resources, at (415) 464-5127.

Sincerely,

A handwritten signature in blue ink, appearing to read "Cicely A. Muldoon". The signature is fluid and cursive, with the first name being the most prominent.

Cicely A. Muldoon
Superintendent



Federated Indians of Graton Rancheria
Sacred Sites Protection Committee
6400 Redwood Drive Suite 300
Rohnert Park, CA 94928

August 29, 2011

Cicely Muldoon
Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

RE: EIS for a Special Use Permit at Drakes Estero

Dear Superintendent Muldoon:

RECEIVED
Point Reyes National Seashore
AUG 30 '11
<input type="checkbox"/> SUPT
<input checked="" type="checkbox"/> MGMT ASST
<input type="checkbox"/> VRP
<input checked="" type="checkbox"/> SPEC PARK USES
<input type="checkbox"/> RANGE
<input checked="" type="checkbox"/> NAT RES
<input checked="" type="checkbox"/> CULT RES
<input type="checkbox"/> SCIENCE
<input type="checkbox"/> INTERP
<input type="checkbox"/> FACILITIES
<input type="checkbox"/> CONTRACTING
<input type="checkbox"/> BUDGET
<input checked="" type="checkbox"/> INFO TECH
<input checked="" type="checkbox"/> CENT FILES

The Federated Indians of Graton Rancheria (FIGR), a federally recognized Tribe and sovereign government, has received the information you have provided regarding the writing of an EIS for a Special Use Permit at Drakes Estero. We understand the project review must comply with the National Historic Preservation Act, Section 106 and 36 CFR Part 800.

We concur with your request to use the EIS process to meet the Section 106 "government to government" consultation requirements with our Tribe for this project. We have appreciated the information and discussions we have had on this topic in the past.

We look forward to continuing our mutually respectful relationship with Point Reyes National Seashore in our effort to protect the cultural resources at this location. We will carefully review the Draft EIS when it is available and provide comments where necessary.

Respectfully,

Nick Tipon
Sacred Sites Protection Committee
707 478-1737

STATE OF CALIFORNIA

Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
 SACRAMENTO, CA 95814
 (916) 653-4082
 (916) 657-5390 - Fax

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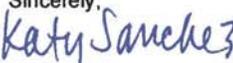
Brannon Ketcham
 National Park Service
 1 Bear Valley Rd.
 Point Reyes Station, CA 94956

RE: SCH# 2010104004 Drakes Bay Oyster Company Special Use Permit; Marin County.

Dear Mr. Ketcham:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Completion (NOC) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
 - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
 - If any known cultural resources have already been recorded on or adjacent to the APE.
 - If the probability is low, moderate, or high that cultural resources are located in the APE.
 - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
 - The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
 - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
 - A Sacred Lands File Check. USGS 7.5 minute quadrangle name, township, range and section required.
 - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. Native American Contacts List attached.
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
 - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
 - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
 - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

 Katy Sanchez
 Program Analyst
 (916) 653-4040

cc: State Clearinghouse

Native American Contact List
Marin County
October 13, 2011

The Federated Indians of Graton Rancheria
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Rohnert Park, CA 94928 Southern Pomo
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(415) 259-7819 Cell

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The Federated Indians of Graton Rancheria
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707-566-2291 - fax

The Federated Indians of Graton Rancheria
Frank Ross
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Novato , CA 94948 Southern Pomo
miwokone@yahoo.com
(415) 269-6075

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2010104004 Drakes Bay Oyster Special Use Permit; Marin County.



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**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

NOV 17 2011

DBOC SUP EIS
c/o Superintendent
Cicely Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, California 94956

Dear Ms. Muldoon:

NOAA's National Marine Fisheries Service (NMFS) appreciates the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP), September 2011, prepared by the National Park Service (NPS) and their consultants.

NMFS reviewed the DEIS primarily from the perspective of the impacts of the action alternatives on marine resources and ecosystems. We also reviewed the adequacy of the methodology used in the analysis and identified additional information NPS should consider as it develops the final Environmental Impact Statement (FEIS). Our detailed comments are provided in the attachment.

Based on a review of our records relating to the trust resources for which NMFS has responsibilities under the Marine Mammal Protection Act, the Endangered Species Act, and the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act:

- Based on the evidence and information that has been made available, the harbor seal population in Drakes Estero appears stable and healthy. We have no documentation of any recent disturbance of harbor seals by the aquaculture operation. We have no records of violations by DBOC or law enforcement investigations of DBOC under the Marine Mammal Protection Act.
- There is no indication of negative impacts to fish species of concern to NMFS, including ESA-listed salmonids and their critical habitat.
- There do not appear to be any significant impacts of DBOC operations on Essential Fish Habitat in Drakes Estero overall. We have no records to indicate that DBOC is impacting eelgrass to the degree that the eelgrass is not healthy or not providing adequate habitat values to the estero.



To improve the overall technical quality of the FEIS, we recommend that NPS:

- Modify the methodology so that all the alternatives are compared to the existing conditions baseline (as described in sections 1502.14, 1502.15, and 1502.16 in the CEQ regulations at [http://ceq.hss.doe.gov/ceq regulations/regulations.html](http://ceq.hss.doe.gov/ceq%20regulations/regulations.html))
- Add the National Aquaculture Act of 1980 as a relevant law informing this DEIS
- Expand the analysis to consider impacts on cultural resources and visitor experience
- Modify the analysis to take into account the ability of ecosystems to recover from negative impacts
- Provide a more balanced consideration of the ecosystem services and the positive impacts of shellfish aquaculture on habitat and water quality
- Include additional citations from the scientific literature.

In June 2011, NOAA adopted a new Marine Aquaculture Policy to enable the development of sustainable marine aquaculture within the context of NMFS multiple stewardship missions and broader social and economic goals. Under this policy, NOAA is committed to protecting wild species and ecosystems, and making timely and unbiased management decisions based upon the best scientific information available. We are committed to working with Federal partners to provide the depth of resources and expertise needed to address the challenges facing expansion of aquaculture in the United States. In keeping with the policy of encouraging sustainable aquaculture while protecting wild species and ecosystems, NMFS offers the attached comments on the Park Service's DEIS.

Thank you for consideration of our comments and recommendations. If you have any questions regarding our comments please contact Monica DeAngelis, 562-980-3232, Monica.DeAngelis@noaa.gov or Diane Windham, 916-930-3619, Diane.Windham@noaa.gov.

Sincerely,



for Rodney R. McInnis
Regional Administrator

Enclosure

**Enclosure: National Marine Fisheries Service Comments on the Draft
Environmental Impact Statement for Drakes Bay Oyster Company Special Use
Permit**

General Comments

The design of the program to monitor harbor seal abundances and disturbance events at sub-sites within the Estero does not permit explicit tests of the impacts of mariculture. The disturbance data appear to have been collected during surveys designed primarily to monitor seal abundance trends, and observations of disturbance are not sufficiently representative to infer the proportionate contribution of mariculture-related disturbance relative to other sources of disturbance to hauled-out seals. NMFS recommends a reevaluation of monitoring protocols if the intent is to collect information regarding disturbances and potential impacts at the individual level, stock, and/or population level.

The EIS does not take into account nor provide any detailed analysis of other human influenced impacts to the ecosystem at the Estero. In Brasseur and Fedak (2003), tagged seals showed a 50% reduction in use of the area compared to use of the same area in years with less recreational boat traffic, and these disturbances also appeared to influence diving behavior. It is not clear how close the oyster rack and oyster bag areas are within Drake Estero to the sand flats used by harbor seals as haul-out sites. NMFS recommends evaluating the 100 yard recommended distance. It is important to recognize that the analysis showing a relationship between mariculture activities and a decline in the mean seal attendance at two of three haul-out subsites in Drakes Estero does not demonstrate cause and effect in the DEIS. NMFS recommends that data be provided on this topic. Potential negative effects of mariculture operations and activities on the harbor seal population represent the most serious concern expressed in the DEIS, which cannot be fully evaluated because these effects have not been directly investigated. NMFS supports precautionary measures to reduce the likelihood of disturbance of seals which are consistent with current management practices in the U.S.

NMFS found that some important information is missing or has been overlooked in the DEIS. NMFS provides additional references in the comments below and recommends that the NPS review these references and expand on the impacts analysis in the final EIS. Many of the ecosystem services provided by oyster aquaculture in Drakes Estero have only been touched on lightly, and NMFS hopes that the comments below are helpful in that regard.

Specific Comments

Chapter 1, Page 21

"In early December 2009, NPS and CCC issued letters of violation to DBOC for placement of Manila clam bags within one of the harbor seal exclusion areas (NPS 2009cxx; CCC 2009axxi). In response, DBOC stated that clam bags had been placed within a harbor seal protection area because their global positioning system (GPS)

coordinates were misread and the misplaced clams would be immediately removed (DBOC 2009axxii)."

In this instance: the document does not 1) report whether any disturbances were recorded during this time, 2) which harbor seal exclusion area; and, 3) with what proximity to the seals. This level of information could assist with determining appropriate distances that may minimize take as defined under the Marine Mammal Protection Act (1972).

Chapter 1, Page 25

"Commercial shellfish operations could potentially impact these species and their habitat through habitat competition, habitat improvement or degradation, noise and physical disruptions, and introduction of nonnative species."

Each of these points should be better described in the document, including how commercial shellfish operations may impact harbor seals as well as other potential activities that may or may not impact the harbor seals.

Page 32, Cultural Landscapes

NMFS recommends against dismissing cultural resources as a topic for further analysis. Oyster culturing in Drakes Estero pre-dates existence of the National Seashore; DBOC's facilities and structures provide a cultural landscape as well as a culturally historical experience for park visitors. Impacts of the alternatives on cultural resources need to be analyzed because the project objectives stated on page 5 include "manage natural and cultural resources to support their protection, restoration, and preservation." As stated in the DEIS (p. 32): "According to NPS-28: Cultural Resource Management Guideline (NPS 2002b), a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, building, walls, and vegetation, and by use reflecting cultural values and traditions."

Page 37, Relevant Federal Laws and Policies

Please add the National Aquaculture Act of 1980, as amended, as a relevant law to be considered in the laws and policies informing this EIS. The National Aquaculture Act of 1980, as amended (16 U.S.C. 2801, et seq.), which applies to all federal agencies, states that it is "in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States." The purpose of the act includes "encouraging aquaculture activities and programs in both the public and private sectors of the economy; that will result in increased aquacultural production, the coordination of domestic aquaculture efforts, the opportunities, and other national benefits."

Chapter 2, Page 61

"The lease boundaries were drawn prior to creation of the harbor seal protection areas designated in the 2008 SUP. Another concern with the original lease boundaries is that they were drawn without the aid of technology. It should be noted that the lease boundaries were also identified in the SUP as the offshore permit area. DBOC asserts

that the original mapping mistakenly excluded five of the racks in Bed 6 that were in existence at the time (DBOC 2011eii). Although most correspondence has cited five racks outside of the existing lease areas, the GIS data provided by DBOC and being used to support the development of this EIS indicates six racks outside the lease boundaries."

The document does not describe how the harbor seal protection areas were designated in the 2008 SUP. NMFS recommends that the boundaries of the harbor seal protection areas be reviewed. In addition, it is not clear if the harbor seal protection area encompass all areas where harbor seals have been observed to haul out or only the major areas with large numbers of harbor seals. The maps should also designate which haul out sites are used as rookeries during pupping season. In addition, NMFS recommends that suitable haul out sites for harbor seals that may not currently be used by harbor seals be described in the document and mapped. This will aid in review of the potential for more haul out sites to be available as described in Alternative A. Both the harbor seal protection areas and the lease boundaries should be mapped using the same program to aid in comparison. NPS should explain why six racks are considered outside of the lease boundaries if almost all correspondence has cited five, or update the information regarding the request to adjust the boundary to Lease M-438-01, if it has been finalized. A reference should be provided.

Chapter 3, Page 179, Harbor Seals

"Monitoring objectives have often included detection of changes to population size, evaluating reproductive success, and identifying anthropogenic or environmental factors that affect the existing population."

NPS should provide documentation that there has been an effect on the reproductive success of harbor seals at the Estero through the monitoring objectives.

"Population size and reproductive success of harbor seals can be attributed to a number of factors, one of which is the availability of high quality breeding habitat."

NPS should provide details on habitat quality and how it may or may not relate to the Estero. Drakes Estero represents an important site for harbor seals, supporting about 20% of the mainland California population, thus a comparison of the present habitat quality and the future habitat quality for each of the Alternatives should be discussed.

"Seal abundance at haul-outs is influenced by multiple factors, including time of day, tide level, current direction, weather, season, year, disease outbreaks, disturbances from other wildlife, and human activities (Yochem et al. 1987; Suryan and Harvey 1999; Thompson, Van Parijs, and Kovacs 2001; Grigg et al. 2004; Hayward et al. 2005; Seuront and Prinzevalli 2005; NAS 2009). Environmental factors such as El Niño–Southern Oscillation events can affect attendance and reproduction (Trillmich and Ono 1991; Sydeman and Allen 1999) due to the changes in weather patterns and ocean temperatures that usually accompany this Pacific Ocean phenomenon."

It is not clear if the protocol to collect data on harbor seals in the Estero considered these factors and how these factors may or may not influence the numbers of seals hauled out and anthropogenic disturbances versus non-manmade disturbances (*i.e.*, presence of a predator). NMFS recommends that these factors be considered and analyzed in the document under each of the alternatives.

"Human activities can disturb seals at haul-out sites, causing changes in seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007)."

NMFS is familiar with these peer-reviewed articles, but harbor seals are still hauling out at the Estero. Based on the data provided in the EIS, it is difficult to assess the future haul out potential that the Estero may have or whether the current environment has depressed this potential. Haul-out sites in Drakes Estero and adjacent to Estero according to the EIS have been divided into eight subsites based on habitat conditions. The EIS does not detail what these habitat conditions may be and the importance of these conditions to the environment for hauling out. During a single day, seals can move from one subsite to another. NMFS recommends a discussion on how movement from these subsites may be impacted by any of the proposed Alternatives.

Chapter 3, Page 181, Harbor Seals

"The document is under internal review by MMC. This report will be reviewed and considered as part of the NEPA process for this EIS when it becomes available."

NMFS supports the consideration of this document.

"Between spring 2007 and 2010, more than 250,000 digital photographs were taken from remotely deployed cameras overlooking harbor seal haul-out sites in Drakes Estero. The photographs were taken in one minute intervals. Because the collection of these photos was not based on documented protocols and procedures, the body of photographs does not meet the Department's standards for a scientific product. As a result, the photographs have not been relied upon in this EIS. These photographs are posted and available for review on the NPS website at http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_videos.htm."

NMFS recommends that the EIS provide information on which photographs, if any, were analyzed for impacts to harbor seals. NMFS was unable to review all 250,000 photographs and was not able to know which photographs were of importance for analysis purposes.

Chapter 3, Page 206

"High ambient sound levels from human voices, and sound events associated with human activities (e.g., driving cars, hiking), have been observed to have negative population-level, behavioral, and habitat-use consequences in many species (Frid and Dill 2002; Landon et al. 2003; Habib, Bayne, and Boutin 2007)."

The term "high ambient sound" is confusing. If the human voices are audible above the ambient sound, then that should be discussed in detail. If use of the term "high ambient sound" is meant to indicate that the ambient sound at Drake's is higher than in other areas, this comparison should be made and measurements provided.

Chapter 3, Page 206

"The impacts of underwater noise on marine mammals have been widely documented during the past 40 years, and have been the subject of three reports by the NAS (NAS 2003)."

NPS should provide a detailed description of all activities that may cause underwater noise that may impact marine mammals in the Estero. NPS should also provide information on how the measurements were obtained, calculated, and modeled. The noise threshold that is being used to determine potential behavioral changes, temporary threshold shift, or permanent threshold shift should also be provided and mapped with the location of the sound source and the distance the sound propagates in the environment, taking into consideration the specific factors that may influence sound propagation in the Estero.

Chapter 3, Page 213

"Visitors to the area use Drakes Estero and its environs for recreational activities such as kayaking and hiking. Drakes Estero is open annually to kayakers from July 1 to February 28. Closures are in place from March 1 to June 30 to protect harbor seals during pupping season."

NMFS supports efforts to minimize impacts to harbor seals, particularly during pupping season.

Chapter 3, Page 227

"Seashore staff are responsible for ensuring that closure policies within Drakes Estero are adhered to during harbor seal pupping season. Harbor seal pupping season occurs within Drakes Estero between March 1 and June 30. During this period, all recreational nonmotorized boats, including kayaks, are prohibited from entering Drakes Estero."

NMFS and the USFWS are the Federal agencies with statutory responsibility under the Marine Mammal Protection Act (MMPA) and Endangered Species Act. , NMFS is the agency responsible under the MMPA for harbor seal conservation. NMFS supports measure to minimize impacts to harbor seals and encourages the NPS to work directly with NMFS Southwest Regional Office regarding development of harbor seal conservation and management measures.

Chapter 4, Page 233, General Analysis Methods

"This analysis incorporates the best available scientific literature applicable to the region and setting, the resources being evaluated, and the actions being considered in the alternatives."

There are limited references available that pertain specifically to Drakes Estero, thus, NMFS recommends that best available scientific literature include information from other, similar geographic areas, where it is logical to infer similar results; such literature should not be treated as not meeting a scientific standard. There is an abundance of scientific literature addressing oyster growing in esteros and estuaries, with similar, if not the same, species addressed including Pacific oyster, eelgrass, harbor seals, etc. NMFS provides some references and can provide additional references. In the absence of available geographically-specific scientific literature, NMFS encourages the NPS to utilize such similar sources of information.

Chapter 4, Page 234, Baseline for Comparison

The DEIS states that "...the term "baseline" refers to the condition against which a change is being compared for assessment of impact in this EIS. It should not be confused with other definitions of the term." The baseline against which the no-action alternative is assessed is generally existing conditions. This is consistent with DOI regulations guiding the implementation of NEPA, which state:

"The analysis of the effects of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives."

However, the description continues "The action alternatives, on the other hand, are generally using the no-action conditions as the baseline condition. In other words, the analysis of the action alternatives may be documented by contrasting the expected future conditions under each action alternative to the expected future conditions under the no-action alternative."

This approach to the defining of, and comparing alternatives to different baselines, is unusual. It is common practice in NEPA documents to compare all alternatives to one baseline defined as existing conditions. NMFS questions whether it is appropriate to compare the impacts of one alternative to one baseline, and then compare impacts of other alternatives to a different baseline in the DEIS. NMFS recommends all the alternatives be compared to the existing conditions baseline. Please see sections 1502.14, 1502.15, and 1502.16 in the CEQ regulations at: <http://ceq.hss.doe.gov/ceq/regulations/regulations.html>.

Chapter 4, Page 235, Duration of Impact

NMFS recommends modification of the methodology to consider the extent to which adverse impacts are reversible. The methodology for assessing impacts that is described in Chapter 4 defines long-term impacts as any impact lasting longer than 1 year. This breakout between short- and long-term impacts is not useful in terms of evaluating the ability of natural systems to recover from any effects incidental to ongoing operations of DBOC over a 10-year period – e.g., effects on eelgrass from boat traffic or presence of gear on the site. Permit conditions could minimize impacts on eelgrass, and mitigation measures could accelerate recovery from any scarring or other effects incidental to

operations. NMFS is interested in working with NPS to develop appropriate permit conditions and mitigation measures.

Chapter 4, Page 236

“Alternative A: All 95 racks would be removed, including approximately 4,700 posts (2-inch by 6-inch boards) and more than 179,000 linear feet (approximately 5 miles) of pressure-treated lumber would be removed (this is anticipated to take one to two months outside the harbor seal pupping season, March 1 to June 30).”

The EIS should provide information regarding the impact to removing the 95 racks, including the timing, the type of equipment necessary to remove the racks, etc. These activities should be assessed to determine potential impacts to harbor seals.

Note: Since Alternatives B, C, and D have similar, if not identical impacts, all comments for Alternative B are applicable to C, D, and E.

Chapter 4, Page 237

“Closure of the lateral channel during the harbor seal pupping season (March 1–June 30). Maintenance of a 100-yard buffer from any hauled-out harbor seal.”

NPS should provide an analysis of how closure of the lateral channel during the pupping season would decrease the potential risk of disturbance to harbor seals. NPS should discuss the potential impacts of closing the lateral channel if other areas receive higher traffic and discuss the potential impacts of the proximity of harbor seal haul outs to boat traffic areas (i.e. could other harbor seal areas be impacted during the pupping season). In addition, the 100-yard buffer may need to be reviewed. NMFS offers its expertise on this matter and would support mitigation measures that would limit activities during pupping season (which is very similar to mitigation measures NMFS requires for MMPA incidental take authorizations).

Chapter 4, Page 241, Human-cause Noise Sources (Other than DBOC)

“Other ongoing sources of noise in the Estero (DBOC-related noise is evaluated as an impact topic) such as overflights and use of cars along Sir Francis Drake Boulevard, has the potential to impact resources in and around the project area. These actions could impact wildlife and wildlife habitat (seals and birds), soundscapes, and visitor experience and recreation.”

NPS should provide further details regarding overflights and how they may impact seals (i.e. potential noise levels, height of aircraft, etc.).

Chapter 4, Page 242, Planning and Management Activities

“Past, present, and future planning and management activities at the park include the following projects/activities: New GMP, Adapting Drakes Beach Visitor Access Facilities to Accommodate Anticipated Coastal Change to Improve Natural Coastal Process, Abbotts Lagoon Coastal Dune Restoration Project, Regular trail maintenance, Approval of research permits. These actions could impact eelgrass, wildlife and wildlife habitat

(harbor seals and birds), special-status species, soundscapes, wilderness, visitor experience and recreation, and NPS operations."

If "take" of harbor seals may occur as a result of these management activities, NPS should contact NMFS to determine if an MMPA incidental take authorization is needed.

Chapter 4,, Page 243, Expansion of Mariculture within Humboldt Bay, California (under Past, Present, and Reasonably Foreseeable Actions in the CUMULATIVE IMPACT ANALYSIS METHODOLOGY Section)

The DEIS discusses the potential Humboldt Bay Harbor, Recreation and Conservation District's pre-permitting studies for possible expansion of shellfish leases in Humboldt Bay, which has been awarded a \$200,000 grant from the Headwaters Fund. It is unclear why a project that is not within or even remotely near Drakes Bay Estero is included in this section. While Humboldt Bay growers may provide up to approximately 70% of CA's oysters, the fact remains that CA growers are not able to meet demand. Bottom leases from the State of CA are in a state of flux as the Fish and Game Commission updates the bottom lease template; current growers in the Point Reyes area have not been able to expand their operations and are unable to meet demand, whether it is localized or not. As has been discussed, seafood demand far exceeds the United State's ability to meet it. The United States imports 84% of our seafood, and about 50% of that is met through imports of foreign (and often unregulated) aquaculture products. It is inaccurate to assume that growers in the Point Reyes area could increase their production to make up for the loss of DBOC, or employ former DBOC employees, as their operations aren't able to expand currently (J. Finger, Hog Island Oyster Co., pers. comm. 2010). Similarly, it is unrealistic to assume that the Humboldt Bay proposed shellfish expansion, if permitted, could compensate for the loss of DBOC at the local level. The positive impacts of an expanded Humboldt Bay shellfish industry would not provide economic benefits to the local businesses and employees in the Point Reyes area, provide tourism dollars to the Point Reyes local economy, nor satisfy localized demand for oyster products - it would potentially provide economic benefits to the Humboldt County area.

Chapter 4, Page 244, CDFG Marine Life Protection Act Initiative

"The Estero de Limantour SMR prohibits take of any living marine resource (CDFG 2010c)."

NPS should provide a definition for the term "take" as it is used in this context.

Chapter 4, Page 244

"Under the MMPA, if an activity is determined to be harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required."

The activities that may cause marine mammal behavioral disturbance or harassment need to be analyzed and NMFS should be contacted to discuss the possible issuance of an Incidental Harassment Authorization.

Chapter 4, Pages 250-259, Impacts of Alternatives A, B, C, and D, Impact Analysis, Wetlands

The DEIS cites Bullard, Lambert, et al. 2007, in stating that the removal of "...up to 142 acres of bags, racks, and other shellfish cultivation equipment from Drakes Estero would also reduce the potential introduction of noxious species such as the exotic tunicate *Didemnum*, which has been shown to displace habitat for naturally occurring benthic organisms around the commercial shellfish operations infrastructure." It is important to note that none of the sites surveyed in this reference included any sites in Drakes Estero or neighboring shellfish operations in the vicinity. While it is wise to manage shellfish operations to avoid the introduction of such exotic species, this can be addressed by use of best management practices in the shellfish industry. Some efforts that may be effective in removing other fouling organisms from aquaculture gear and shellfish stocks include dessication and mild acid dips. Careful management practices could also potentially limit spread of noxious species. NMFS is willing to work closely with DBOC and the NPS to identify and assure implementation of best management practices at the DBOC operation.

NMFS believes that the habitat value of shellfish aquaculture gear has not been adequately addressed in the DEIS. NMFS refers the NPS to Dealtris, Kilpatrick, and Rheault (Dec. 2004), who's findings indicate "...that shellfish aquaculture gear provides habitat for many organisms throughout the year, and is especially beneficial to ecosystems that support native species of recreationally and commercially important fish and invertebrates in their early life stages." They conclude that "...shellfish aquaculture gear has substantially greater habitat value than a shallow nonvegetated seabed, and has habitat value at least equal to and possibly superior to submerged aquatic vegetation." In another paper by the same authors, they determined that shellfish aquaculture gear provides a structured habitat protecting juvenile fish from predation as well as substrate for some forage species that fish and invertebrates feed upon. The authors found significantly higher organism abundance and higher species diversity in shellfish aquaculture than in submerged aquatic vegetation, and thus they conclude that shellfish aquaculture gear had habitat value equal to or possibly greater than submerged aquatic vegetation (Dealtris, Kilpatrick, and Rheault 2007).

NMFS recommends a more detailed examination of the various sources of impacts to the wetlands of Drakes Estero, in addition to addressing the impacts from DBOC, in order to fairly assess sources and degree of impacts relative to DBOC. Dumbauld et al. 2009 point to the fact that water quality is impaired in some West Coast shellfish growing areas, but that this is more often due to presence of fecal coliforms. Additionally, NMFS suggests that the NPS further examine park visitor traffic and recreational activities as it relates to wetland impacts; in particular, the effects of kayakers in Drakes Estero, the effects of launching kayaks from wetland areas, and potential foot-traffic trampling on wetland plants and mudflats.

The water quality benefits from oyster growing in Drakes Estero should be described in greater detail. The resilience of Drakes Estero – the ability to withstand and recover from a variety of naturally occurring and human induced actions –should be described in terms of all potential impacts. Additional references would enhance the assessments in this

section. Dumbauld et al. 2009 states that "...bivalve aquaculture does not remove area from the estuary or degrade water quality, and thus is less likely to undermine resilience." They go on to suggest that bivalve aquaculture hasn't been linked to "...reduced adaptive capacity of the larger ecological system."

Overall, NMFS views shellfish aquaculture as an environmentally sustainable activity in Drakes Estero and encourages the NPS to provide more in-depth information regarding to what degree other human activities, in addition to the already described activities, have the potential to degrade the ecosystem health of Drakes Estero, including impacts from park visitors/recreationists.

Chapter 4, Page 262-272, Impacts of Alternatives A, B, C, and D, Impacts on Eelgrass

NMFS suggests that the NPS provide a more in-depth analysis of the ecosystem services provided by oyster culturing, in terms of beneficial impacts to eelgrass. The DEIS focuses on negative impacts and appears to have overlooked much information regarding the beneficial ecosystem services provided by oyster culture that are evident in the DEIS references.

The DEIS refers to use of aerial photographs of eelgrass scarring – since the NPS did not utilize over 200,000 digital photographs of harbor seal activity in Drakes Estero, due to the fact that these photos did not meet the NPS protocol or standard for "scientific evidence", the NPS should explain the protocol or standards that allow the use of these aerial photographs but preclude the use of the other photo database.

The DEIS suggests that Alternative A (No Action Alternative) would result in long-term beneficial impacts on eelgrass habitat. However, the NAS report (2009) states that "Nevertheless, removal of the Pacific oysters and nonnative clams under culture and all the structures used in the culture process would carry the consequences of removing the direct and indirect influences of the biochemical processes now provided by the filtration, excretion, and biodeposition of the shellfish and the influences of structural substrates of the oysters and the racks and bags that now hold them." Please see comments and references in the **Impacts on Wetlands** section, above. Additionally, the NAS report suggests that even though the estero has excellent water quality due in part to a strong tidal flux, the filtration provided by the cultured oysters likely lowers turbidity, which is beneficial to eelgrass production. Kaiser (2001, *in* NAS 2009) also suggests that shellfish cultivation processes have "...a generally positive influence on the overall water quality of a system." Beneficial water quality effects from shellfish culturing provides buffering from events such as storm turbidity or phytoplankton blooms, resulting in enhanced water quality and clarity, and potentially increased light penetration (DeAngelis, 1986 *in* NAS 2009, Rice 2001, Connecticut Sea Grant 2009/2020), which in turn promotes the growth and spread of eelgrass. Further, the NAS report clarifies that many populations of seagrass along the west coast demonstrate an increased abundance trend, including Drakes Estero.

Typically, eelgrass is absent directly under the oyster culture structures, but it appears the scale of these losses is tied directly to the scale and density of the structures, resulting in small reductions in eelgrass density and cover (NAS, 2009). The overall small-scale culturing footprint of DBOC "...suggests that these effects would be localized." In fact, the NAS report states that the estimate of eelgrass loss from propeller scars is less than 8% of total eelgrass cover (NPS, 2007e; Brown and Becker 2007 *in* NAS 2009). The amount of eelgrass in Drakes Estero appears to have approximately doubled over the years of oyster cultivation in the estero. While there are localized impacts from eelgrass coverage under the areas of oyster cultivation, the overall health of eelgrass in the estero appears to be very good, apparently owing largely to the tidal flux and good water quality. Without the water quality and filtration benefits from the oyster culturing in Drakes Estero (which pre-dates NPS presence), NMFS questions whether the current health of eelgrass would be as good. In fact, when compared to eelgrass beds in the Estero de Limatour, which has no oyster culturing, AMS (2002) found that sites in Drakes Estero showed higher eelgrass blade counts, again suggesting the beneficial effects of oyster culturing on eelgrass in Drakes Estero.

Chapter 4, Page 286-293, Impacts on Wildlife and Wildlife Habitat: Fish Alternatives A, B, C, and D

As described above, in the **Eelgrass** section, it appears that the health of Drakes Estero and its abundant eelgrass beds may be benefitting from the oyster culture being conducted there. There are no records in NMFS' files to indicate that DBOC is impacting the eelgrass to the degree that the eelgrass is not healthy, or that fish species of NMFS' concern are negatively impacted, including ESA-listed salmonids, nor does it appear there are significant impacts to EFH in Drakes Estero overall. The water quality and filtration services from oyster cultivation appear to support healthy eelgrass populations, and thus provide habitat and cover for fish typically found in Drakes Estero. Please see the additional comments and references in the **Eelgrass** section.

Chapter 4, page 294, Methodology

"This section summarizes the impacts on Pacific harbor seals from the actions that would potentially occur under each alternative. In consideration of the populations of harbor seals found within the project area as discussed in chapter 3, impacts are evaluated in the context of the type of impact (direct, indirect), the nature of the impact (i.e., type of disturbance to wildlife and wildlife habitat), the quality and amount of harbor seal habitat impacted, and the potential for risks posed by proposed actions (e.g., introduction of nonnative species)."

The NPS reports on harbor seals are not referenced as a data source in this document.

Chapter 4, page 295, Impacts of Alternative A

"The elimination of DBOC boat traffic (up to 12 trips per day, six days per week), especially during harbor seal pupping season (March 1 through June 30), coupled with ongoing restrictions on recreational access during the same time, would likely result in beneficial impacts on harbor seals by reducing human disturbance and displacement effects during important harbor seal reproductive periods (Suryan and Harvey 1999)."

NMFS believes that the removal of the oyster facility should be considered an action. The no-action alternative would leave activities at the current level and should be analyzed as such for this EIS. NPS should describe the potential beneficial impacts expected by reducing human disturbance and displacement effects. Typically, as a minimization measure in our permits, NMFS does take into consideration a reduction or elimination of activities that may impact seals during pupping season. It is not clear from this document what activities may cause take of harbor seals, as defined under the MMPA. NMFS offers our expertise to NPS to help address potential disturbance to seals. The DEIS does not consider what impact elimination of oyster activities or recreational activities may have on deterring other possible impacts to harbor seals (*i.e.*, does the presence of humans deter potential predators to harbor seal; would the cessation of oyster activities increase the number of coyotes that could predate pups?).

“Becker, Press, and Allen (2011) show harbor seal haul-out areas documented in the Estero, including along the entire lateral channel in the central portion of Drakes Estero. Discontinuing operations would remove bags and boat traffic from this area, allowing for potential expansion of use areas by the seals.”

The west and middle areas of the lateral channel are shallow and full of dense eelgrass (as another map in the draft EIS clearly shows). The harbor seals haul out where they have hauled out for many years – from the deep east end of the lateral channel onto a large beach. It is recommended that the document describe suitable habitat for harbor seals, determine whether this suitable habitat is available in the Estero, whether there has been historical use of these areas prior to anthropogenic impacts, etc. It is difficult to predict whether harbor seals would colonize a new area, but if the habitat has characteristics that have been shown to be important components of harbor seal haul-out sites, those areas should be described and mapped.

Chapter 4, page 296, Impacts of Alternative A

“Due to the removal of potentially disruptive activities associated with DBOC within Drakes Estero, alternative A would be expected to result in beneficial impacts on harbor seals. Removal of shellfish infrastructure from within Drakes Estero may require the use of motorboats for a period of up to two months. This disturbance would continue to generate the human-caused noise that currently disrupts harbor seals, but would be conducted outside of the harbor seal pupping season to minimize adverse impacts.”

NMFS recommends that these disturbances should be characterized and described in more detail in the document with references provided.

“Under alternative A, NPS would install a gate to prevent all boat-related recreational access to Drakes Estero during harbor seal pupping season (March 1- June 30 annually). The placement of a locked gate restricting boat access to Drakes Estero during pupping season would be an effective deterrent, preventing adverse impacts on harbor seals from boat use during pupping season.”

NPS should provide information as to why a locked gate would not be possible for any of the other alternatives.

“This restriction on recreational access to Drakes Estero would be expected to have beneficial impacts on harbor seals. As described above, alternative A would result in long-term beneficial impacts on harbor seals because of the reduced disturbance to seals that would result from the termination of DBOC operations and associated human activities within Drakes Estero. Alternative A may also result in short-term minor adverse impacts because while impacts to harbor seals would continue, the impacts associated with rack removal would be localized and slightly detectable, and would not affect the overall structure of the natural community.”

The long-term beneficial impacts need to be described and evidence needs to be provided.

Chapter 4, page 296, Cumulative Impact Analysis

“Past, present, and reasonably foreseeable future actions have the potential to impact harbor seals and harbor seal habitat within the project area. These actions include kayaking, planning and management activities, and the CDFG MLPA initiative.”

Details on the planning and management activities need to be provided and what component of those activities that may impact harbor seals needs to be analyzed.

“While harbor seal disturbances could still occur outside of the pupping season, such disturbances are less likely to have population-level effects during that time of year.”

NPS should provide a reference for the implication that disturbances are having population-level effects and/or that adverse population-level effects have been documented at the Estero.

“Some limited use of motorized boats within Drakes Estero may take place for research or administrative purposes.”

NPS should specify the research and administrative purposes that may impact harbor seals as it is difficult for NMFS to determine based on the information provided whether or not an MMPA Incidental Harassment Authorization (IHA) may be necessary.

Chapter 4, page 297, Cumulative Impact Analysis

“Alternative A, in combination with the MLPA would result in only recreational clamming allowed within the Estero, thus reducing potential disturbance-related impacts.”

NPS should analyze and discuss the potential disturbance to harbor seals caused by recreational clamming and describe how these potential disturbances would be managed.

Chapter 4, page 297, Alternative A, Conclusion

“Disturbance would be limited to recreational kayakers, hikers on the adjacent landscape, and aircraft.”

NMFS recommends that these disturbances be described in detail and impacts to harbor seals analyzed.

“The cumulative impact would be long-term beneficial, and alternative A would contribute an appreciable beneficial increment to the overall cumulative impact. With respect to harbor seals, alternative A is consistent with relevant law and policy because removal of DBOC operations from Drakes Estero would remove an unnatural stimulus that currently affects harbor seal behavior. Additionally, the decrease in disturbance to this species would be consistent with MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107).”

NMFS recommends providing additional information on which relevant laws and policies are referred to in this statement and how these are consistent with the requirements of the MMPA for harbor seals.

Chapter 4, page 297, Impact Analysis, Alternative B

“Continued boat traffic DBOC operations would continue to be subject to the harbor seal protection protocol as part of the SUP. This protocol prohibits boat travel and general operations, including placement of bags, moorings, and installation of floating racks, within the established harbor seal protection areas (see figure 3-5). Other restrictions contained in the existing protocol, such as closure of the lateral channel (also shown on figure 3-5) during the harbor seal pupping season (March 1–June 30) and maintenance of a 100-yard buffer from any hauled-out harbor seal, would continue to be in effect.”

This analysis when compared to Alternative A's impact analysis is confusing as many details are missing from each analysis. NMFS suggests improving the impact analysis for comparative purposes.

Chapter 4, page 298, Impact Analysis, Alternative B

“Under alternative B, the current setback requirement of 100 yards from any hauled out seal (MMPA) would be retained. While the NAS 2009 indicates that larger setbacks are used in Europe, this setback is based, in part, on the MMPA standard, the scale of the Estero, and the ability of DBOC staff to reasonably see and recognize a hauled-out harbor seal.”

It is not clear what MMPA standard is being referred to here, as a requirement of maintaining at least a distance of 100 yards from harbor seals is not a requirement or a standard under the MMPA. If take occurs, than an IHA may be needed. If NPS wants to establish a set distance to avoid take, then NPS should work with NMFS to evaluate what distance would be appropriate.

“Lastly, there may be impacts on harbor seals related to underwater sounds produced by DBOC based on previous research on other marine mammals (NAS 2003). Alternative B would result in long-term moderate adverse impacts on harbor seals for another 10 years due to displacement effects within Drakes Estero of human activities associated with DBOC's operation and the potential for disturbances that are known to disrupt harbor seal behavior and displace seals. These impacts would be clearly detectable.”

NPS should provide detailed information on underwater sound produced by DBOC and analyze how it may impact harbor seals, including thresholds for a temporary threshold shift or permanent threshold shift. If masking could occur, NPS should provide information and analysis to determine the impacts of the masking. Based on the analysis in the DEIS it is not clear if there are impacts related to underwater sound or if there may be impacts. NPS should provide information on whether masking has been documented in the monitoring. In addition, in order to support the statement that impacts would be clearly detectable the EIS needs to provide specifics on how these impacts would be detected (monitoring, what thresholds would be used, etc.). If the impacts can be clearly detected, NPS should describe the research study that demonstrated detection of impacts.

Chapter 4, Page 294-303, Impacts on Wildlife and Wildlife Habitat: Harbor Seals, Alternative A, B, C, and D

NMFS notes that, with development and implementation of an interagency harbor seal protocol in 1992 at the site of DBOC, there has been no documentation in NMFS' files regarding disturbance of harbor seals related to operation of DBOC. In addition, there have been no reported violations of MMPA or law enforcement investigations on record. There does not appear to be any evidence of population-level effects from disturbance of the harbor seals in Drakes Estero; the estero's harbor seal population appears stable and healthy. NMFS encourages the NPS to expand the analysis to carefully examine and disclose other sources of disturbance to this seal population, including but not limited to kayaks landing on the sandbar haul-out area and general kayak activity in the estero, along with documentation of NPS enforcement of MMPA requirements with park visitors. In addition, NMFS recommends that NPS expand the analysis to examine populations of harbor seals at other locations that are subject to human disturbance for comparison.

NMFS understands that the Marine Mammal Commission (MMC) convened a panel to review the science used by the NPS in analyzing the Drakes Estero harbor seals, and that a report from the MMC should be forthcoming. NMFS recommends that completion of the final EIS be delayed until this report is available to the NPS and the public, so that the information in the report can be incorporated into the analysis by NPS and is made available to all parties reviewing the DEIS.

Chapter 4, Page 314-328, Impacts on Special Status Species, Alternatives A, B, C, and D, Central California Coho Salmon Critical Habitat, Central California Steelhead

Please see comments regarding Fish, above. NMFS has no documented concerns regarding DBOC related to potential impacts to Central Coho Salmon Critical Habitat or Central Valley Steelhead.

Chapter 4, Page 316

“During DBOC close out procedures, however, there would be an increase in traffic along the access road, as property and debris are removed from the site. This may cause a temporary increase in risk of vehicle strikes. This close out process is likely to take place outside the seasonal seal closure and last up to two months.”

This implies that vehicles may strike harbor seals. NPS should clarify how this is related to the harbor seal closure and how this may or may not benefit harbor seals.

Chapter 4, Page 321

“In addition, under alternative B, the NPS would not install a gate to enforce seasonal closures to recreational access to Drakes Estero during harbor seal pupping season. Thus, traffic levels over the access road would be expected to continue at current levels.”

As previously noted it is not clear why the gate cannot be installed and provide needed access when necessary during the harbor seal pupping season if installation of the gate is intended to regulate human water use near rookeries in the Estero.

Chapter 4, Page 337-349, Impacts on Water Quality Alternatives A, B, C, and D

Please see comments above in the **Wetlands** and the **Eelgrass** sections. In addition, NMFS suggests that the broader water quality issues described in this section can be addressed in partnership. The NPS, NMFS, CA Department of Fish and Game, California Coastal Commission, and Regional Water Quality Control Board can effectively work together with DBOC to formulate permit conditions and best management practices to address the issues and improve water quality conditions in Drakes Estero. NMFS is available to provide expertise in such an effort.

Chapter 4, Page 354

“Offshore noise-generating operations would include continued motorboat traffic in Drakes Estero.”

Although the EIS does provide information regarding dBA levels, these dBA levels do not specify the distance these sound emitters could operate compared to where seals are expected to haul out (i.e. what the received level from the sound source may be at the haul out sites) and how it corresponds to thresholds of 90dBA for in-air for harbor seals.

Figure 4-2 shows how sounds would dissipate from a pneumatic drill operating on the dock at the onshore facilities. Two noise contour levels were selected for these maps.

NMFS recommends this figure include harbor seal haul out sites to determine if there is any potential for overlap.

Table 4-2. Figure 4-1 and Figure 4-2

NPS should provide additional information describing how the noise generated and the propagation from the sound source was estimated or modeled.

Chapter 4, Page 359

“Negative population-level, behavioral, and habitat-use consequences of higher ambient sound levels from human voices, along with sound events associated with human activities (motorists, hikers), have been observed in many species (Frid and Dill 2002; Habib, Bayne, and Boutin 2007). Human activities can disturb harbor seals at haul-out sites, causing changes in harbor seal abundance, distribution, and behavior, and can even cause abandonment (Suryan and Harvey 1999; Grigg et al. 2002; Seuront and Prinzivalli 2005; Johnson and Acevedo-Gutierrez 2007). Finally, demolition of the damaged main dock and construction of the proposed dock would require the-temporary use (less than one month assuming six days per week, 8 hours per day) of heavy vehicles, which typically emit sound levels between 60 and 80 dBA, depending on which equipment is necessary-(FHWA 2006). This would cause a temporary adverse impact on the natural soundscape.”

NPS should indicate whether it expects that these sound sources would be perceived by the harbor seals and describe the potential impacts .

Chapter 4, Page 360

“The use of heavy machinery would be at a level that would cause vocal communication to be difficult at distances of less than 16 feet.”

NPS should provide information on the proximity of this activity to the seals and whether it is assumed that there will be no auditory damage to seals' hearing. In addition, NPS should provide information on whether this may result in masking. NPS should describe in detail any potential impacts to the seals of the visual component of the machinery or activities, which may cause seals to flush from haulout areas.

Chapter 4, Page 368, Impacts on Wilderness Alternative A, B, C, and D

The DEIS mentions that human activities can cause disturbance of harbor seals and changes in harbor seal behavior, distribution and abundance, and even site abandonment. It would be useful for the NPS to report on (or conduct a study if it hasn't been addressed) the effects of human activities in Drakes Estero to harbor seals, beyond the effects from DBOC. The park has high visitation from various sectors of the public, among those are hikers and kayakers in the vicinity of DBOC. The kayak launch is adjacent to DBOC; it seems likely that kayakers could also unintentionally disturb harbor seals while kayaking in the estero. Information on rates of harbor seal disturbance correlated to park visitors and their activities would be most informative and would add to the body of knowledge regarding overall harbor seal disturbances.

The DEIS states that as discussed in greater detail under the impact topic of soundscapes, a motorboat in Drakes Estero produces a sound of 71 dBA at 50 feet (Noise Unlimited,

Inc. 1995). On a calm day, it may take over 3,200 feet (0.6 miles) for this sound to dissipate to natural sound levels. NPS should explain how this distance was calculated.

Chapter 4, Page 373

"Additionally, the generation of noise by DBOC operations, both onshore and within Drakes Estero, would have the potential to disturb birds and harbor seals."

NPS should provide additional information on which activities would generate the noise.

Chapter 4, Page 381, Impacts on Visitor Experience and Recreation

The DEIS states that approximately 50,000 people visit DBOC annually. Oyster culturing in Drakes Estero pre-dates the park presence. There is a long cultural history of oyster culturing in Drakes Estero that is not adequately addressed in the DEIS. Please see comments in the **Cultural Landscapes** section. NMFS recommends that the NPS expand this discussion in both sections.

The DEIS states that the gate would prohibit motorized boat access to the water during certain times, but would allow visitors to access Drakes Estero on foot. The proposed gate would allow visitors to access the site outside harbor seal pupping season (between July 1 and February 28). NMFS recommends providing this information in previous sections describing Alternative A as visitor access on foot should be analyzed or discounted for potential disturbance to harbor seals.

Chapter 4, Page 389-402, Impacts on Socioeconomic Resources, Alternative A, B, C, and D

The DEIS identifies a localized economic impact if DBOC is removed from Drakes Estero. Consistent with the NOAA National Aquaculture Policy, NMFS supports the development and maintenance of sustainable marine aquaculture. In a down-turned economy, the localized loss of jobs as well as the localized and statewide reduction in the availability of oysters, may be more significant than is represented in the DEIS. With up to 34% of oyster production in CA coming from DBOC, the removal of DBOC would be significant. The DEIS notes the potential permitting of a Humboldt Bay shellfish expansion proposal and assumes that such expansion can compensate for the loss of oyster availability from DBOC, should it be removed. This is a potential long-term outcome, but only if the proposal is successfully permitted. Initial feasibility studies are just getting underway for the Humboldt Bay shellfish expansion proposal and any actual permitting, leasing of shellfish growing areas, and availability of product is not realistic in the near future. In addition, such potential expansion does not benefit the local economy of the Point Reyes area. Potential jobs created in Humboldt Bay will not benefit displaced workers from DBOC, nor will the sale of Humboldt Bay shellfish benefit the Point Reyes area. Potential DBOC visitors will not inject funds into the local economy nor provide benefits to local tourism that is currently afforded. Please also see comments in the **Expansion of Mariculture within Humboldt Bay, California** section above.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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POINT REYES NS

DEC 05 2011

Ms. Cicely A. Muldoon, Superintendent
National Park Service
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, California 94956

Subject: Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit in Point Reyes National Seashore, Marin County, California (CEQ#20110328)

Dear Ms. Muldoon:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (EIS) for the above action. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

The Draft EIS analyzes four alternatives for issuance of a special-use permit for a commercial oyster operation in Drakes Estero in Point Reyes National Seashore. The intent of the EIS is to assist the National Park Service (NPS) in evaluating the environmental impacts of considering expiration or issuance of the special-permit. NPS has not identified a preferred alternative. EPA has rated all the alternatives in the Draft EIS as Lack of Objections (LO) (see enclosed "Summary of Rating Definitions").

We appreciate the opportunity to review this Draft EIS. When the Final EIS is released for public review, please send one hard copy and one CD to the address above (mail code: CED-2). Should you have any questions regarding our comments, please contact me at (415) 972-3521, or contact Stephanie Skophammer, the lead reviewer for the project. Stephanie can be reached at (415) 972-3098 or skophammer.stephanie@epa.gov.

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures: Summary of Rating Definitions

Cc: Brannon Ketcham, Point Reyes National Seashore
Melissa Stedeford, Project Manager

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.



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POINT REYES NS



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL MARINE FISHERIES SERVICE
 Southwest Region
 501 West Ocean Boulevard, Suite 4200
 Long Beach, California 90802-4213

DEC - 8 2011

DBOC SUP EIS

c/o Cicely Muldoon, Superintendent
 Point Reyes National Seashore
 1 Bear Valley Road
 Point Reyes Station, California 94956

Dear Ms. Muldoon:

In a letter dated November 17, 2011, NOAA's National Marine Fisheries Service (NMFS) provided comments on the National Park Service's Draft Environmental Impact Statement (DEIS) for Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP), September 2011. NMFS provides the following points of clarification regarding our previous comment letter:

- NMFS' statement regarding impacts of DBOC operations on Essential Fish Habitat (EFH) in Drakes Estero was based on an initial review of information provided in the DEIS. NMFS will make a final determination regarding effects to EFH following a thorough evaluation of adverse effects to EFH completed as part of an EFH consultation for the proposed action pursuant to the EFH provisions of the Magnuson-Steven Fishery Conservation and Management Act.
- NMFS does not exclusively endorse the findings in Dealteris *et al.* (2004), but recognizes this information is part of the scientific literature available on the subject of aquaculture.
- NMFS does not have information indicating that water quality effects from the DBOC operations benefit the overall health of eelgrass in Drakes Estero. Similarly, NMFS does not have information suggesting that eelgrass would be harmed should DBOC operations cease.

Please consider these clarifying comments in conjunction with the NMFS November 17, 2011, comment letter.

In addition, although NMFS was unable to complete an extensive review of the recent Marine Mammal Commission (MMC) Report on Mariculture and Seals in Drake's Estero, NMFS supports the MMC's recommendation to conduct additional harbor seal disturbance studies and offer our expertise in the development of future study design and potential management/adaptive management plans that could be informed by these future studies.



Again, we thank you for the opportunity to comment on the National Park Service's DEIS and look forward to reviewing the final EIS. If you have any questions regarding these comments, please contact Korie Schaeffer, 707-575-6087, Korie.Schaeffer@noaa.gov, Diane Windham, 916-930-3619, Diane.Windham@noaa.gov, or Monica DeAngelis, 562-980-3232, Monica.DeAngelis@noaa.gov.

Sincerely,

A handwritten signature in blue ink that reads "Kevin Chin". The signature is written in a cursive style.

for Rodney R. McInnis
Regional Administrator



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

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DEC - 8 2011

Regulatory Division

SUBJECT: File Number 2010-00116N

Draft EIS DBOC SUP
c/o Ms. Cicely Muldoon
National Park Service
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, California 94956

Dear Ms. Muldoon:

This is in response to the request for comments on the Draft Environmental Impact Statement (DEIS), dated September 2011, regarding the Special Use Permit for the Drakes Bay Oyster Company located at 17171 Sir Francis Drake Boulevard in the Town of Inverness, Marin County, California.

The U.S. Army Corps of Engineers (USACE) would like to emphasize that impacts to waters of the U.S., including wetlands, vegetated shallows, and open waters of the U.S., may be subject to regulation pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA) (33 U.S.C. Section 403) and/or Section 404 of the Clean Water Act (CWA) (33 U.S.C. Section 1344). If a permit for activities is required and they do not fall under the Nationwide Permit program, an Individual Permit, processed pursuant to Section 10 RHA and/or Section 404 CWA, would be required. Projects resulting in the discharge of fill material into waters of the U.S. must comply with the Guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b) of the CWA (33 U.S.C. Section 1344(b)).

USACE recommends that the above information be included in the Laws and Policies section for all Issues/Impact Topics analyzed in "Chapter 4: Environmental Consequences" which may have an impact on jurisdictional waters of the U.S., including wetlands, eelgrass, and portions of wildlife and wildlife habitat.

-2-

We look forward to continued cooperation in the preparation of the EIS. Should you have any questions regarding this matter, please call Bryan Matsumoto of our Regulatory Division at 415-503-6786. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter.

Sincerely,

gane m. Heelis

W Torrey A. DiCiro, P.E., PMP
Lietenant Colonel, U.S. Army
Commanding



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
1416 Ninth Street, 12th Floor
Sacramento, CA 95814
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EDMUND G. BROWN, Jr. Governor
CHARLTON H. BONHAM, Director



December 20, 2011

Cicely A. Muldoon, Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Subject: Comments on the draft Environmental Impact Statement for Drakes Bay Oyster Company

Dear Ms. Muldoon:

The Department of Fish and Game (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP). The Department is serving as a cooperating agency on the project to provide the National Park Service (NPS) with technical assistance and available data specific to the DBOC's operation. The Department has special expertise in management and oversight of aquaculture in California. We offer the following comments and recommendations on this project in our role as a cooperating agency and as a trustee agency over the State's fish and wildlife resources.

Thank you for your consideration of this letter. The Department stands ready to work with all stakeholders in providing the requisite biological and program expertise on any proposed action involving the oyster farm to help move this situation to a final resolution.

As you know, the Fish and Game Commission (Commission) and Department have issued and administered the state water bottom leases in Drakes Estero since their creation in 1934. At this time, we have two general comments on the DEIS, which the NPS might find useful as it determines whether to continue this special use. Our specific comments in the attached appendix tier from the general comments in this letter.

First, we encourage NPS to acknowledge the potential benefits of shellfish aquaculture to the estuarine environment in Drakes Estero. For example, based on data analyzed by NPS staff, eelgrass coverage has approximately doubled in Drakes Estero from 1991 to 2007, suggesting aquaculture operations might not negatively impact estuary ecology or the eelgrass population. Second, given the intense scrutiny of and passionate debate about the oyster farm and NPS proposed actions, we urge careful attention to data and analysis of such data with regards to conclusions that aquaculture has or has not caused long-term impact to Pacific harbor seal colonies in Point Reyes National Seashore or eelgrass.

Conserving California's Wildlife Since 1870

Cicely Muldoon, Superintendent
Page 2 of 2
December 20, 2011

The Department is committed to working with you to ensure the DEIS contains the best-available data and resources to evaluate the potentially adverse and beneficial impacts of mariculture operations within Drakes Estero. To that end, we have included with this letter prior correspondence from the Department in 2007 and 2008 regarding our position about the ongoing issues between DBOC and the NPS. These letters clarify our view of management authority.

Thank you for the opportunity to provide comment on the Draft Environmental Impact Statement (EIS) for Drakes Bay Oyster Company (DBOC) Special Use Permit. Please see the enclosed table that provides more technical comments provided by Department staff. If you require additional information, please contact Ms. Kirsten Ramey, Marine Region Aquaculture Coordinator at (707) 445-5365 or via e-mail at kramey@dfg.ca.gov.

Sincerely,



Charlton H. Bonham
Director

Enclosures (3)

cc: Marija Vojkovich, Department of Fish and Game, Santa Barbara, CA
Joe Milton, Department of Fish and Game, Sacramento, CA
Kirsten L. Ramey, Department of Fish and Game, Eureka, CA

PUBLIC DRAFT

Point Reyes National Seashore Drakes Bay Oyster Company Special Use Permit EIS

Draft Environmental Impact Statement

Reviewer Office: Department of Fish and Game

Comments due: December 9, 2011

Reviewer	Page	Line	Comment/Proposed Revision
DFG	XXIII	Bullet 7	Include "At the expiration..." to clarify when the removal activities would be required
DFG	XXV	Bullet 1	Include "...unpermitted infrastructure, would remain until November 30, 2022" to clarify how long structures would remain.
DFG	7	Paragraph 2	The CDFG manages 16 shellfish leases held by 8 such operators
DFG	7	Paragraph 3, 1st sentence	Does this number include DBOC? If not, there are 9 operations (11 including DBOC). The 19 operations are not all on granted or private tidelands. The rest are private land-based facilities.
DFG	20	Paragraph 3	The original letter from Studdert to the FGC dated 8/6/93 requested manilla clams be added to lease M-438-01. This indicates there was no intent to limit clams to M-438-02 and that an error was made by the FGC when drafting the correspondence letter to the Lessee and that error was simply transferred forward to all the subsequent documents.
DFG	81	Paragraph 1, Last sentence	Can you include a mention of who the permitting agencies would be for this type of discharge to inform the reader?
DFG	84	Paragraph 5	Incorrect lease number
DFG	120	Preferred Alternative	It is unclear why NPS did not identify a preferred alternative in the Draft EIS. How will NPS determine whether input received from the public is objective? Why is NPS relying on public comment to select a preferred alternative?
DFG	127	Figure 2-14	Alternative B does not include the boat transit path as does Alternative C & D.
DFG	172	Last paragraph	It is important to note that the 2007 estimate of eelgrass coverage has approximately doubled since 1991 based on Brown and Becker 2007.
DFG	197	Last paragraph	Should 2010 read 2011 Management Plan...?
DFG	219	Paragraph 1	Some facilities are land-based and not on tide or submerged lands.
DFG	219	Paragraph 2	Change mariculture to shellfish because we have 1 kelp lease that is not part of the 18 count.
DFG	219	Paragraph 3	There are 19 operations on grant or private tide and submerged lands or are private land-based facilities. 9 operations are on granted or private tidelands and 10 are land-based facilities.
DFG	219	Last paragraph	The Humboldt Bay Harbor, Recreation and Conservation Act was passed in 1970. The formation of the District was in 1973.
DFG	220	Paragraph 1, Last sentence	DFG coordinates with the shellfish hatcheries on disease and health certifications. The CA Department of Public Health is the lead on certifying growing areas for shellfish.
DFG	220	Paragraph 1, Last sentence	Remove the words "... through an agreement with NPS, ..." and change to "... but it would continue to exercise oversight related to stocking..." The Department has this authority through law, not through an agreement with NPS; however, an agreement could be drafted to memorialize DFG's authority within PRNS.
DFG	220	Paragraph 1	This paragraph specifically discusses shellfish operations in Humboldt Bay, but there are other important shellfish growing areas in CA, which is the title of the section. In addition, the paragraph concludes with the discussion of the DBOC lease and NPS landowner jurisdiction which doesn't feel appropriate for this section.

DFG	220	Paragraph 1	FGC and DFG have not issued and administered, respectively leases to DBOC despite the fact the lands are owned by the U.S. The RUO contemplated that the leases could be renewed. The language of the RUO states "Upon expiration of the reserved term a special use permit may be issued for the continued occupancy of the property...provided, however, that such permit will run concurrently with and will terminate upon the expiration of State water bottom allotments assigned to the Vendor." Thus the state water bottom leases were renewed in 1979 and again in 2004 given that the RUO is valid until 2012.
DFG	222	Paragraph 1	In Humboldt Bay, the largest producer provides production information by gallons and DFG has inquired as to the method that the Humboldt Bay producers use, but has not received the conversion factors yet.
DFG	222	Last paragraph	In Humboldt Bay, all information reported to DFG has been in gallons.
DFG	223	Paragraph 1	It is true that DFG data has not been calculated consistently and is not inclusive of all statewide production; however, DFG's data is complete for all of Marin county which should be included in the socioeconomic analysis. Statewide shellfish production is appropriate to evaluate the success of the industry, but inappropriate when you are evaluating the effects of the loss of a local product on a local economy. DFG records between 2007-2009 show DBOC contributed 68% of total oysters and 63% within Marin County. NPS has all the data necessary to include the local economic analysis for shellfish production and if not, it can easily be provided.
DFG	223	Paragraph 2	The production rates for Drakes Estero are similar to production rates in Tomales Bay. Please make note that Tomales Bay production is a combined total of 10 leases held by 6 companies.
DFG	223	Paragraph 3	Humboldt Bay data reported to DFG has been in gallons
DFG	224	Table 3-7	It is unclear where the 32,500,000 number comes from in the Kuiper report. The report estimates 35.5 million with 250,000 imported oysters so that comes to 35,250,000. The number for total shellfish would need to be adjusted as well.
DFG	224	Table 3-7	The same issue with not using the same conversion rate is present in the Kuiper numbers. He assumed a 180 oysters per gallon average where that may not be the actual conversion rate for some producers. His report contains numbers from the same growers that DFG received production from, but his data has used a conversion rate of 180 which may overestimate actual production. Kuiper says 1 gallon of oysters has 180 in it, but in reality the company only produces 140 oysters in a gallon the numbers have been inflated in the Kuiper report. This needs to be identified and explained.
DFG	260	Eelgrass Section	It should be noted that the SUP 2008 placed a new restriction on boat use by DBOC that directed boat passage away from the "lateral channel" throughout the year, not just during the harbor seal pupping season. This redirected the oyster boats to a route over shallower eelgrass beds which has resulted in increased damage to eelgrass beds from propeller scars.
DFG	262	Paragraph 4	Brown and Becker 2007 concluded that the areal coverage of eelgrass in Drakes Estero has approximately doubled between 1991 and 2007.
DFG	263	Paragraph 1	There is no historic data on eelgrass so how can the document state "Recover of eelgrass..."? This implies that eelgrass was once present in that location when that is not known.
	263	Paragraph 3	Eelgrass would be expected to colonize NOT recolonize given the fact that there is no historic data on eelgrass coverage before mariculture operations were established.
	263	Paragraph 3	The document says recovery of eelgrass would provide additional habitat for fish communities where in Humboldt Bay, oyster structures were found to harbor more fish than either eelgrass or open mudflats (Pinnix et al., 2004).
	265	Paragraph 4	What methodology was used to determine eelgrass versus algae in the aerial photography?

DFG	266	Paragraph 1	Waddell 1964 studied the impacts of dredging culture methods on eelgrass recovery which is not applicable to Drakes Estero given that method is not used. In addition, Zieman 1976 studied turtle grass, a different species, in his evaluation of recovery rates based on disturbance from motor boats. This statement is misrepresenting the situation in Drakes Estero. The NAS report states "Based on existing data on growth and recovery of <i>Zostera marina</i> in Willapa Bay and elsewhere on the West coast, recovery from propeller scars should be rapid (weeks) for this species, unless the rhizomes were removed from the sediment (still less than 2 years based on above studies) or there was repeated scarring on a regularly travelled route.
DFG	266	Paragraph 1	Koch 2002 concluded that the negative impact of boat-generated waves on seagrass habitat quality was minimal. The strongest impact was at low tide when boat-generated waves resuspended a small fraction of total suspended solids, which redeposited in a few minutes resulting in little or no impact on the light availability. In fact, the boat-generated waves apparently caused epiphytes and particulate matter to be dislodged from the leaves creating a positive effect for the seagrasses. This study is incorrectly cited in the document.
DFG	266	Paragraph 2	The research conducted by Wechsler 2004 and Harbin-Ireland 2004 (as cited in NAS 2009) in Drakes Estero was not focused on eelgrass and no empirical data was collected to support the statement in the document that states "...shown to reduce coverage and density of eelgrass due to shading or preemption of space." There have been no studies in Drakes Estero that supports this statement. The studies that NAS uses were in Willapa Bay and involved long-line and stake culture.
DFG	266	Paragraph 2	Bag culture is present in intertidal areas and so avoids the eelgrass beds which grow from rhizomes in the subtidal sediments.
DFG	266	Paragraph 2	Tallis, et al. 2009 explored 3 cultured methods, dredged on-bottom, hand picked on-bottom and long line off-bottom. The only method in Drakes Estero that can be compared to this study is the long line method. Depending on long-line spacing, eelgrass in long line areas may occur at densities indistinguishable from nearby uncultivated areas. None of the studies cited in this paragraph evaluated bag culture.
DFG	266	Paragraph 3	Is there a reference to support the last two statements in this paragraph?
DFG	275	Paragraph 1	Hosack et al. 2006 found infaunal macrofauna in eelgrass, open mudflat, and oyster culture in Willapa Bay were not significantly different from each other. Ferraro and Cole 2007 found that oysters and eelgrass supported equally diverse assemblages of benthic species in Willapa Bay. In Humboldt Bay, diversity and abundance of infaunal invertebrates around long line culture were similar to those observed at eelgrass reference sites (Rumrill and Pouiton 2004).
DFG	279	Top of page	The only known hosts for <i>Haplosporidium nelsoni</i> (MSX disease) are <i>C. gigas</i> and <i>C. virginica</i> and do not present a risk to native mollusks.
DFG	279	Paragraph 3	Actually Herborg, et al. 2009 did not evaluate vectors for primary introduction of <i>D. vexillum</i> so has been mis-interpreted here.
DFG	295	Impact Analysis	Motorboat activities (assumed as a proxy for DBOC activities) make up 4% of the total disturbances in Drakes Estero over the 7 years of surveys during the breeding season. Other anthropogenic sources account for a total of 58.3% of all noted disturbances (data derived from Sarah Allen's presentation at the MMC Meeting on February 21, 2010). NPS states that the seashore receives more than 2 million visitors annually. The data suggests that the visitors to the park have a much greater influence on overall disturbances than the presence of motorboats within the estuary. Why is this not discussed under the cumulative impact analysis? It seems more appropriate that this is a long-term moderate or major adverse impact on harbor seals.

DFG	296	Paragraph 5	According to the Pacific Harbor Seal Monitoring at PRNS 2009 and 2010 Annual Reports and past reports, the high number of disturbances observed in Drakes Estero were caused by hikers on Limantour Beach. Shouldn't this be addressed in the cumulative impacts for the No-Action Alternative?
DFG	298	Paragraph 4	Calambokidis, et al. 1991 showed that kayakers cause harassment of harbor seals at a greater distance than do powerboats.
DFG	298	Paragraph 4	What research supports the assertion that sounds produced by DBOC would cause impacts to harbor seals?
DFG	389	Paragraph 3	This section should also compare shellfish production at DBOC at the regional level (within Marin County) which DFG and NPS has complete records for.
DFG	392	Last paragraph	DFG records between 2007-2009 show DBOC contributed 68% of total oysters and 63% of total shellfish within Marin County. Thus contributing far more to the local economy than presented in the DEIS.
DFG	394	Last paragraph	Where is the data that supports the claim that 70% of the oysters consumed in CA come from Humboldt? The reference used here is an advertisement and has not been fact checked for accuracy.
DFG	394	Last paragraph	The planning and permitting effort in Humboldt Bay will most likely not double the amount of area available to shellfish production.

disturbances observed in Drakes Estero were caused by hikers on Limantour Beach. Shouldn't this be addressed in the cumulative impacts for the No-Action Alternative?



State of California - The Resources Agency

ARNOLD SCHWARZENEGGER, Governor

**DEPARTMENT OF FISH AND GAME
OFFICE OF THE GENERAL COUNSEL**

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 (916) 654-3821


March 25, 2008

 The Honorable Jared Huffman
 Assemblymember, Sixth District
 Post Office Box 942849
 State Capitol Building
 Sacramento, California 94249-0006
Re: Drakes Bay Oyster Farm

Dear Assemblymember Huffman:

The purpose of this letter is to explain the position of the Department of Fish and Game (Department) regarding the ongoing issues between the Drakes Bay Oyster Farm and the Point Reyes National Seashore (PRNS). The Department Office of the General Counsel has provided the following discussion.

By way of review, in 1965 the Legislature granted to the United States certain tide and submerged lands in Drakes Estero for the PRNS. This grant contains a reservation of "the public right to fish" on the granted lands, consistent with article 1, section 25 of the California Constitution, and includes the area used by the oyster farm under two state water bottom leases. In November 1972, the prior owner of the oyster farm conveyed his property to the United States, subject to a reservation of occupancy and use in the grant deed.¹ By its terms, the reservation expected the state water bottom leases to continue until the 30-year term expired in 2012, after which the oyster farm would operate under a special use permit from PRNS that would run concurrently for remainder of the leases. Since the leases were subject to a maximum term of 25 years, the agreement anticipated that the leases could and would be renewed, and this in fact was done by the Fish and Game Commission (Commission) in 1979. The leases were renewed again in 2004, but made contingent upon compliance with the 1972 reservation and, after its expiration, with any PRNS special use permit. In 1976, the Point Reyes Wilderness Act designated over 25,000 acres as wilderness, and another 8003 acres as "potential wilderness." The oyster farm lies within this latter area.

In 2006, the PRNS questioned how "the public right to fish" reservation in the 1965 tidelands grant affected the status of the state water bottom leases.² In

¹The State of California was not a party to this transaction; It is unknown whether it was legally reviewed by the United States Department of the Interior, Office of the Solicitor.

²Much has been made of correspondence in 1965 and 1966 by then-Department Director W.T. Shannon, stating that the oyster farm is covered by "the right to fish" reservation. The two

Conserving California's Wildlife Since 1870

Assemblymember Huffman
 March 25, 2008
 Page 2

May 2007, the Department concluded that since fishing was distinct from aquaculture, it was not subject to this tidelands grant reservation. Since both the 1972 grant reservation and the 2004 state water bottom lease renewal require compliance with all rules and regulations of the National Park Service, the Department concluded that "primary management authority" for the oyster farm lies with the PRNS. However, given the context of the original question, this conclusion properly refers only to primary management authority *over the state water bottoms that are the subject of the leases* and not to any other aspect of the aquaculture operation. The 1965 legislative grant did not create an area of exclusive federal jurisdiction, and the oyster farm continues to be subject to ongoing Department management, oversight, and enforcement.³

Three considerations are evident here. First, the Fish and Game Code expressly designates aquaculture as a form of agriculture⁴ and distinguishes it from commercial fishing.⁵ Such a distinction is apparent in statutes pre-dating the 1965 grant.⁶ Further, aquaculture involves the culture and harvesting of animals that are private property while fishing involves the permitted take of fish that are part of the public trust.⁷ A corollary to this second consideration is that "the right

letters are brief, general, and conclusory. However, while the link between the reservation and ongoing state authority is legally incorrect, the letters correctly assert concurrent jurisdiction over the oyster farm. This is consistent with the Department's May 2007 conclusion that the PRNS has "primary management authority" over the state water bottoms that are the subject of the leases, as well as the conclusions in this letter. See also footnote 3, below.

³This includes the payment of taxes and fees, facility registration, regulation of aquaculture products, facility inspections, stocking of aquatic organisms, brook stock acquisition, disease control, and importation of aquatic plants and animals.

⁴Fish and Game Code § 17. This 1962 provision codifies the long-standing concepts of common law (Hagenburger v. City of Los Angeles (1942) 51 Cal.App.2d 161 [a *farm* is a tract of land devoted to agricultural purposes]); ordinary dictionary meaning (*to farm* is "to grow or cultivate in quantity <shellfish>" (Webster's New Collegiate Dictionary 450 (9th ed. 1991)); a *farm* is "a tract of water reserved for the artificial cultivation of some aquatic food; *as an oyster farm*" [emphasis added] (Webster's Third New International Dictionary 824 (1961)); and usage of trade (California Aquaculture Association at: <http://www.californiaaquacultureassociation.org> [mission statement objective is to "assure the recognition of aquaculture as agriculture"]).

⁵Fish and Game Code § 15000(a). The commercial tax on oysters is also separate from the commercial fishing tax on mollusks. See Fish and Game Code §§ 8051, 15406.7.

⁶See e.g. Fish and Game Code of 1933 §§ 815, 820 [distinguishing cultivation of oyster beds from fishing].

⁷Fish and Game Code § 15001. See also Fish and Game Code §§ 45 [defining *fish*], 86 [defining *take*]; see also § 15 [defining *angling*]. These provisions derive from Fish and Game Code of 1933, § 2. This analysis is consistent with that in Pazoli v. Director of Division of Marine Fisheries (1994) 631 N.E.2d 547, 572-573 where the court stated that aquaculture is "a contemporary method of farming shellfish" and "is not fishing, nor can it legitimately be considered a 'natural derivative' of the public's right to fish."

Assemblymember Huffman
 March 25, 2008
 Page 3

to fish" over tidelands is a *public right* and cannot be exclusive.⁸ By contrast, a state water bottom lease confers on a person the *private right* to exclusively cultivate and harvest aquatic organisms in the leased area.⁹ While the Fish and Game Code guarantees the right of public access over the leased areas for reasonable public trust uses, including fishing,¹⁰ we do not believe aquaculturists would agree that "the right to fish" authorizes the public to take their cultivated products.¹¹ Finally, while "the right to fish" secures public access to state lands that are compatible with fishing, *it does not authorize fishing* on those lands¹² and confers on the public no right they did not already have.¹³ The provision is properly read in connection with (now) article 4, section 20 of the California Constitution, which allows the Legislature to delegate to the Commission such powers relating to the protection and propagation of fish and game as it sees fit.¹⁴ It is this provision, not "the public right to fish," which authorizes the leasing of state water bottoms for aquaculture. The irrelevancy of "the public right to fish" to the future of the oyster farm is underscored by two additional factual considerations. First, the existing state water bottom leases are contingent upon the 30-year reservation of use and occupancy which, after it expires, requires a special use permit. If the oyster farm does not receive a special use permit to operate beyond 2012, a material condition of the lease renewals will not have been met. *This situation would be the same even if the underlying tidelands had never been granted to the United States.* Second, it cannot be contested that the 1965 legislative grant and "the public right to fish" only applies to the tidelands, not the adjacent terrestrial areas upon which the oyster farm is physically dependent, and which are part of the potential wilderness designation.

In July 2007, the Department attended a meeting with United States Senator Diane Feinstein and representatives of the oyster farm, the NPS, and the Coastal Commission. The NPS agreed to work with the oyster farm for a special use permit to continue operations through 2012, and all participants recognized that the future of the oyster farm after 2012 depends on the outcome of the wilderness area designation. The Department stands ready to work with all stakeholders in providing the requisite biological and program expertise on any proposed action

⁸Pacific Steam Whaling Co. v. Alaska Packers' Association (1903) 138 Cal. 632, 636.

⁹Fish and Game Code §15402; see also Fish and Game Code of 1933 § 815.

¹⁰Fish and Game Code §15411.

¹¹In fact, the taking of such organisms without lawful entitlement constitutes theft. See Fish and Game Code § 15002; see also Fish and Game Code of 1933 § 821 [requiring consent or permission of owner/occupier of the land].

¹²In re Quinn (1973) 35 Cal.App.3d 473; State v. San Luis Obispo Sportsman's Association (1978) 22 Cal.3d 440.

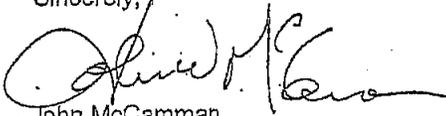
¹³Paladini v. Superior Court (1918) 178 Cal. 369, 372; California Gillnetters Association v. Department of Fish and Game (1995) 39 Cal.App.4th 1145, 1154.

¹⁴Ex parte Parra (1914) 24 Cal.App. 339.

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involving the oyster farm to help move this situation to a final resolution. However, for the reasons discussed above, the reservation of "the right to fish" in the 1965 tidelands grant is clearly inapplicable to this situation. We hope this responds to your concerns. Should you or any of your staff require any additional assistance, please contact Senior Staff Counsel Joseph Milton, Office of the General Counsel, at (916) 654-5336 [jmilton@dfg.ca.gov].

Sincerely,



John McCamman
Acting Director



State of California - The Resources Agency

ARNOLD SCHWARZENEGGER, Governor

**DEPARTMENT OF FISH AND GAME
OFFICE OF THE GENERAL COUNSEL**

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May 15, 2007

 Mr. Don Neubacher, Superintendent
 Point Reyes National Seashore
 Point Reyes Station, California 94956

Re: Drake's Bay Oyster Company

Dear Superintendent Neubacher:

The purpose of this letter is to memorialize the position of the Department of Fish and Game (Department) regarding the lease status of the above-referenced mariculture operation at Drakes Estero, within the Point Reyes National Seashore (PRNS). For the reasons discussed below, we conclude that the mariculture operation in question is properly within the primary management authority of the PRNS, not the Department.

By way of review, the leasing of state water bottoms at Drakes Estero dates to at least 1934. In 1965, the California Legislature granted to the United States, subject to certain limitations, "all of the right, title, and interest...to all of the tide and submerged lands or other lands beneath navigable waters" situated within the boundaries of the PRNS (Chapter 983, Statutes of 1965). The tidelands and submerged lands encompassed by this legislative grant include the leased state water bottoms. Consistent with article 1, section 25 of the California Constitution, this conveyance carried a reservation of the right to fish in the waters overlying these lands. Although the right to fish extends to both commercial and sport fishing, it does not extend to aquaculture operations. Regardless of whether its purpose is commercial or recreational, *fishing* involves the take of public trust resources and is therefore distinct from aquaculture, which is an agricultural activity involving the cultivation and harvest of private property (Fish and Game Code §§ 17, 15001, 15002, 15402). In November 1972, the Johnson Oyster Company (Johnson) conveyed its property to the United States, subject to a reservation of occupancy and use in the grant deed, which provided:

"Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property...provided, however, that such permit will run concurrently with and will terminate upon the expiration of State water bottom allotments assigned to the Vendor. Any permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires."

The reservation specifies a 40-year term and additionally requires, among other things, that Johnson comply with all applicable health and safety laws, and all rules and regulations of the National Park Service. This reservation expires in November 2012.

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DRAKES ESTERO MARICULTURE

After that time, aquaculture operations must continue subject to a special use permit that would run concurrently with, and would terminate upon, the expiration of the assigned State water bottom allotments. Since such allotments are subject to a maximum lease term of 25 years, both the grantor and grantee apparently contemplated that the state water bottom leases then in effect could be renewed, and this was in fact done in 1979. In June 2004, the Fish and Game Commission (Commission) renewed the state water bottom lease for an additional twenty-five years, contingent on this reservation, and also required Johnson to comply "with all rules and regulations now or hereinafter promulgated by any governmental agency having authority by law..." In March 2005, the Commission authorized the assignment of the state water bottom lease to Johnson's successor, Drakes Bay Oyster Company.

The 2004 lease renewal is expressly contingent upon the aquaculture facility's compliance with the 1972 grant reservation and, after its expiration, with any special use permit that PRNS may issue in its discretion. The reservation requires compliance with all applicable health and safety laws and, specifically, with all rules and regulations of the National Park Service. Conversely, the renewal imposes an additional requirement of compliance with all other applicable laws, which reasonably includes those of the National Park Service and of PRNS in particular. For these reasons, we believe the mariculture operation in Drakes Estero is properly within the primary management authority of the PRNS, not the Department.

Should you or any of your staff require any additional assistance, please contact Senior Staff Counsel Joseph Milton, Office of the General Counsel, at (916) 654-5336 or jmilton@dfg.ca.gov.

Sincerely,


L. RYAN BRODDRICK
for Director

cc: Mr. Ralph Mihan, Office of the Solicitor
U.S. Department of the Interior

Mr. Joseph Milton, Senior Staff Counsel
Department of Fish and Game



United States Department of the Interior

NATIONAL PARK SERVICE
Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617

JAN 09 2012

Mr. Milford Wayne Donaldson, FAIA
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit
106 Consultation

Dear Mr. Donaldson,

Pursuant to the National Environmental Policy Act (NEPA), the National Park Service (NPS) has prepared a Draft Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP). On April 1, 2011, the NPS sent a request to your office regarding the Notification of Intent to use the NEPA process to meet Section 106 Obligations at Point Reyes National Seashore. The Draft EIS was released for public comment September 23, 2011 and public comment closed on December 9, 2011. In addition, the NPS provided this document to the State Clearinghouse for concurrent review. The review period for SCH #2010104004 was September 29 – November 29, 2011.

Existing authorizations for DBOC to operate in Drakes Estero expire on November 30, 2012. The Draft EIS explores a range of alternatives, including a no-action alternative which includes expiration of existing authorizations and subsequent conversion of Drakes Estero to full wilderness. Under the three action alternatives, the Secretary of Interior would exercise discretion granted to him under Section 124 of Public Law 111-88, to issue a new 10-year SUP to DBOC for commercial oyster operations in Drakes Estero through November 30, 2022. The action alternatives consider differing levels of onshore facilities and infrastructure and offshore operations.

The Draft EIS does not present a preferred alternative. Full and objective input from the public is encouraged on all of the alternatives analyzed in the Draft EIS. All public comments received on the Draft EIS will be evaluated and considered in the development of the preferred alternative. The NPS is now in the process of compiling and reviewing all comments.

Pursuant to the National Historic Preservation Act, a Determination of Eligibility (DOE) was prepared for the Johnson's Oyster Company (aka Drakes Bay Oyster Company). The DOE found that although the property was significantly associated with the history of oyster production in California, the site lacked integrity and was therefore not eligible for listing on the National Register. In a letter dated August 4, 2011 your office concurred with this finding of ineligibility. As a result, consideration of historic structures and landscapes were not included as impact topics in the DEIS.

In addition, the known archaeological site CA-MRN-296 adjacent to the developed area has been identified and re-documented. This previously recorded site is a partially disturbed Coast Miwok shell midden known to contain human remains. NPS has included the site in its draft National Register nomination for the Point Reyes Indigenous Archaeological District. As a result of recent archaeological work the site boundary has been better defined, and new State site forms have been completed. The archaeological work was done in collaboration with Sonoma State University and the Federated Indians of Graton Rancheria. In all project alternatives the archaeological site would be excluded from the SUP. As a result of the exclusion and provisions that require archaeological monitoring for ground disturbing activities under all DEIS alternatives, archaeological resources were not included as an impact topic in the DEIS.

We would like to meet with you next month to discuss the next steps regarding Section 106 consultation under the National Historic Preservation Act, and how we can provide your office with information necessary to evaluate these alternatives in a manner that will allow for timely review of this project by your agency.

Please contact Gordon White, the Chief of Cultural Resources at (415) 464-5127 to coordinate a meeting. We appreciate your participation in this process.

Sincerely,



Cicely A. Muldoon
Superintendent



United States Department of the Interior

NATIONAL PARK SERVICE
Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617

JAN 09 2012

Dr. Greg Sarris
Tribal Chairman
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

RE: Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit

Dear Dr. Sarris,

Pursuant to the National Environmental Policy Act (NEPA), the National Park Service (NPS) has prepared a Draft Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit (SUP). On August 10, 2011, the NPS sent a request to your office regarding the Notification of Intent to use the NEPA process to meet Section 106 Obligations at Point Reyes National Seashore. On August 29, 2011, Nick Tipon provided a response, concurring with the request to use the Draft EIS to meet the Section 106 "government to government" consultation requirements with the Federated Indians of Graton Rancheria.

The Draft EIS explores a range of alternatives, including a no-action alternative which includes expiration of existing authorizations and subsequent conversion of Drakes Estero to full wilderness. Under the three action alternatives, the Secretary of Interior would exercise discretion granted to him under Section 124 of Public Law 111-88, to issue a new 10-year SUP to DBOC for commercial oyster operations in Drakes Estero through November 30, 2022. The action alternatives consider differing levels of onshore facilities and infrastructure and offshore operations. The Draft EIS was released for public comment September 23, 2011 and public comment closed on December 9, 2011.

The Draft EIS does not present a preferred alternative. Full and objective input from the public is encouraged on all of the alternatives analyzed in the Draft EIS. All public comments received on the Draft EIS will be evaluated and considered in the development of the preferred alternative. The NPS is now in the process of compiling and reviewing all comments.

As part of our planning process the NPS, in collaboration with Sonoma State University and the Federated Indians of Graton Rancheria identified and re-documented the known archaeological site CA-MRN-296 adjacent to the developed area. This previously recorded site is a partially disturbed Coast Miwok shell midden known to contain human remains. NPS has included the site in its draft National Register nomination for the Point Reyes Indigenous Archaeological District. As a result of recent archaeological work the site boundary has been better defined, and new State site forms have been completed. In all project alternatives the archaeological site is excluded from the SUP. In addition to the site exclusion from the SUP, the Draft EIS includes the requirement for archaeological monitoring of all ground disturbing activities as a requirement common to all DEIS alternatives. As a result, and consistent with our discussions with the Tribe prior to release of the DEIS, archaeological resources were not included as an impact topic in the DEIS.

Existing authorizations for DBOC to operate in Drakes Estero expire on November 30, 2012. We would like to meet with you next month to discuss the next steps regarding Section 106 consultation under the National Historic Preservation Act, and how we can provide your office with information necessary to evaluate these alternatives in a manner that will allow for timely review of this project.

Please contact Gordon White, the Chief of Cultural Resources at (415) 464-5127 to coordinate a meeting. We appreciate your participation in this process.

Sincerely,



Cicely A. Muldoon
Superintendent



Sacred Sites Protection Committee
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928
707- 566-2288

August 13, 2012

Cicely Muldoon
Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

RE: Section 106 Consultation for the Drakes Bay Oyster Company Use Permit

Dear Cicely:

The Federated Indians of Graton Rancheria (FIGR), a federally recognized Tribe and sovereign government, has received the materials regarding Section 106 Consultation for the Drakes Bay Oyster Company Use Permit. Section 106 of the National Historic Preservation Act of 1966 (NHPA) require federal projects to meet the requirements of 36 CFR 800 for consultation with federally recognized Tribes. We appreciate your notice and continued consultation for this project.

FIGR provides comments regarding sacred lands and other cultural sites to protect and/or avoid our cultural resources that might be adversely impacted by the scope of work of a project. The Sacred Site Protection Committee (SSPC) is authorized by the Tribal Council to work with agencies to develop the specific plans and procedures to avoid any potential adverse impacts.

We have reviewed the materials you provided regarding this project. We concur with your finding that each of the four alternatives presented in the DEIS will have "no adverse effect" on cultural resources under the standards set forth in 36 CFR 800.8(c)(1).

Respectfully,


Nick Tipon
Sacred Sites Protection Committee



Preserving America's Heritage

October 18, 2012

Ms. Cicely A. Muldoon
 Superintendent
 Point Reyes National Seashore
 Point Reyes, California 94956

REF: *Proposed Drakes Bay Oyster Company Special Use Permit/ Environmental Impact Statement*

Dear Ms. Muldoon:

On July 30, 2012, the Advisory Council on Historic Preservation (ACHP) received your letter inviting us to review the Draft Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company Special Use Permit, which was made available for a 60-day public review and comment period beginning on September 26, 2011. The NPS had previously notified the ACHP of its intent to use the NEPA process for Section 106 purposes in accordance with Section 800.8(c) of the Section 106 implementing regulations, "Protection of Historic Properties" (36 CFR Part 800). In accordance with Section 800.8(c)(2) of the regulations, a federal agency shall submit the Draft EIS to the consulting parties, including the ACHP, "prior to or when making the document available for public comment." Then the consulting parties, including the ACHP, have the opportunity to review the document and voice any objections within the public comment period, which for this Draft EIS closed on November 25, 2011. We have no record of having been provided this document when it was made available to the public, so it was not possible for us to review it or provide any objections within the public comment period.

Despite this procedural problem, we reviewed the documentation provided to us. The NPS has found that the proposed undertaking would not adversely affect historic properties. Provided that this finding has been made in consultation with the California State Historic Preservation Officer (SHPO), Indian tribes, and other consulting parties, and these parties have not objected to this finding, the ACHP need not be further involved in the Section 106 review of this undertaking. If the NPS has received objections from one or more of the consulting parties, we recommend that the NPS address them in accordance with Section 800.5(c) of the regulations. You may request the comments of the ACHP regarding a disputed no adverse effect finding, if needed.

If you would like to discuss the comments provided here for the consideration of the NPS, please contact Katry Harris at (202) 606-8520 or kharris@achp.gov.

Sincerely,

Caroline D. Hall
 Assistant Director
 Office of Federal Agency Programs
 Federal Property Management Section

ADVISORY COUNCIL ON HISTORIC PRESERVATION

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October 29, 2012

Reply in Reference To: NPS120112A

Cicely Muldoon
Superintendent
National Park Service
Point Reyes National Seashore
Point Reyes, California 94956

Re: Drake's Bay Oyster Co. Special Use Permit, Environmental Impact Statement, Point Reyes National Seashore

Dear Ms. Muldoon:

Thank you for your letter dated July 26, 2012, continuing consultation regarding the Special Use Permit for Drakes Bay Oyster Co. within the boundaries of Point Reyes National Seashore. Along with your letter, you submitted a draft document entitled "Revised Version of Issues and Impact Topics: Cultural Resources" (no date) and the Draft Environmental Impact Statement dated September 2011. In a letter dated January 9, 2012, you notified my office that the National Park Service (NPS) intends to "use the NEPA process to meet Section 106 obligations at Point Reyes National Seashore." In your current letter, you state that NPS is "using the process and documentation of the Environmental Impact Statement (EIS)...to comply with Section 106 of the National Historic Preservation Act", referencing 36 CFR 800.8(c)(1). NPS is conducting simultaneous consultation with the Federated Indians of Graton Rancheria, the park's single culturally affiliated tribe.

NPS is considering four alternatives regarding the special use permit. Under Alternative A, the no action alternative, NPS would not issue the permit and all buildings and structures for the existing oyster company would be removed, both onshore and in the estero. Alternative B would issue a new permit based upon onshore and offshore operations as they existed in 2010 for a period of 10 years. Alternative C would issue a new permit based upon onshore and offshore operations as they existed in 2008 for a period of 10 years. Alternative D would issue a new permit allowing for expanded onshore development and offshore operations for a period of 10 years.

NPS has identified the Area of Potential Effects (APE) as a 1,700-acre area covering the majority of Drakes Estero, the areas of the Drakes Bay Oyster Company's onshore and offshore Special Use Permit, their Reservation of Use and Occupancy, the kayak launch parking area, and the access road leading from Sir Francis Drake Boulevard. The APE occurs within the Shafter / Howard Tenant Ranches Historic District, but no district contributors are located within the APE. The APE intersects a portion of the proposed Pointe Reyes Peninsula Indigenous Archaeological District, and one contributing site, CA-MRN-296 is located within the APE. The recently-designated Drakes Bay Historic and Archaeological District is outside the permit area and would not be affected by any of the alternatives. The Drakes Bay Oyster Company's

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onshore and offshore facilities were evaluated by NPS and found to be significant but lacking historic integrity. My office concurred with this determination in a letter dated August 4, 2011.

NPS proposes a Finding of No Adverse Effects for all alternatives being considered in the undertaking of considering issuing a new Special Use Permit to Drakes Bay Oyster Company. No contributors to the Shafter / Howard Tenant Ranches Historic District exist within the APE. The oyster company's facilities are not historic properties. No known resources are located in the estero where the oyster racks are located. CA-MRN-296 will be excluded from the Special Use Permit area, and any ground disturbing activities in the vicinity of the site will be monitored by a qualified archaeologist to ensure the site is avoided.

After reviewing the information submitted, I concur with a Finding of No Adverse Effects for this undertaking. Please be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, you may have future responsibilities for this undertaking under 36 CFR Part 800.

Thank you for seeking my comments and considering historic properties as part of your planning. If you have any questions or concerns, please contact Mark Beason, Project Review Unit historian, at (916) 445-7047 or mbeason@parks.ca.gov.

Sincerely,



Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

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E

SPECIES TABLES

Table E-1. Wintering Waterbird and Shorebird Species in Drakes Estero as Reported by White (1999)

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Table E-3. Rare Plant Species (Excluded Due to Lack of Habitat in Project Area)

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TABLE E-1. WINTERING WATERBIRD AND SHOREBIRD SPECIES IN DRAKES ESTERO AS REPORTED BY WHITE (1999)*

Species by Common Name	Median	11/10-11/98	12/8/98	1/5/99	1/21/99	2/3/99	3/3/99
Red-throated loon	2	0	1	2	1	7	5
Pacific loon	1	0	1	0	0	3	1
Common loon	32	26	30	38	50	24	33
Pied-billed grebe	28	42	57	51	12	14	8
Horned grebe	93	86	84	88	202	97	139
Eared grebe	149	6	63	173	133	256	164
Western grebe	22	11	25	18	27	4	50
Clark's grebe	0	0	0	0	1	2	0
Grebe spp. (western/Clark's)	0	0	0	0	0	0	10
American white pelican	0	0	0	21	0	2	0
Brown pelican	1	5	1	0	1	5	0
Double-crested cormorant	23	34	12	28	17	3	75
Pelagic cormorant	1	1	1	0	0	1	3
Great blue heron	4	4	2	4	6	6	1
Great egret	7	6	7	4	7	5	8
Snowy egret	13	21	11	14	10	4	20
Black brant	59	14	80	38	160	140	5
Canada goose	0	18	0	0	0	0	0
Green-winged teal	175	214	53	164	282	185	129
Mallard	27	112	73	9	14	10	39
Northern pintail	60	344	35	229	67	53	4
Cinnamon Teal	0	2	0	0	0	0	4
Northern Shoveler	7	18	10	3	33	0	0
Gadwall	207	80	343	269	168	174	240
Eurasian wigeon	1	0	1	0	1	0	1
American wigeon	549	425	604	977	982	494	186
Canvasback	30	4	130	12	38	22	136
Greater scaup	29	1	4	47	90	11	52
Lesser scaup	67	0	0	62	395	324	72
Scaup spp.	298	35	291	381	304	195	315
Oldsquaw	0	0	1	0	0	0	0
Surf scoter	131	90	138	85	186	123	217
White-winged scoter	0	0	0	0	1	0	4
Common goldeneye	23	0	21	53	72	25	11
Hooded merganser	4	4	4	4	2	6	1
Red-breasted merganser	41	4	12	45	42	40	48
Bufflehead	1070	328	1127	1541	1013	1222	691
Ruddy duck	2210	793	1272	2640	2765	2308	2112
American coot	99	28	102	95	92	111	119
Black-bellied plover	174	104	168	194	179	156	297
Snowy plover	16	0	6	41	20	41	12

Source: White 1999

* Bird inventory conducted by White (1999) for Drakes Estero includes all bays, Drake's Spit, Sunset Beach and Outer Drake's Bay. The highest count for each species is in bold.

TABLE E-1. WINTERING WATERBIRD AND SHOREBIRD SPECIES IN DRAKES ESTERO AS REPORTED BY WHITE (1999)* (CONTINUED)

Species by Common Name	Median	11/10-11/98	12/8/98	1/5/99	1/21/99	2/3/99	3/3/99
Semipalmated plover	3	17	2	2	42	0	4
Killdeer	23	4	0	33	58	69	13
Greater yellowlegs	20	23	22	18	18	14	34
Lesser yellowlegs	0	0	1	0	0	0	0
Willet	363	359	509	366	325	312	442
Long-billed curlew	19	11	17	15	23	20	20
Marbled godwit	566	311	655	543	589	858	349
Ruddy turnstone	1	0	1	0	0	1	1
Black turnstone	49	3	37	58	39	64	86
Red knot	0	1	0	0	0	0	0
Sanderling	24	22	21	25	95	120	0
Western sandpiper	873	806	321	1479	1592	852	893
Least sandpiper	597	505	186	702	855	689	171
Sandpiper spp. (Western/Least)	0	104	0	0	0	0	0
Dunlin	1467	2031	1072	2775	1396	1538	246
Sandpiper spp. (Dunlin/Western/Least)	0	0	0	0	26	0	0
Long-billed dowitcher	0	0	71	0	0	0	0
Dowitcher spp.	41	61	36	74	45	25	17
Common snipe	0	0	0	1	0	0	0
Ring-billed gull	24	23	17	39	31	25	11
Forster's tern	0	1	0	0	0	0	0
Northern harrier	0	0	0	1	0	0	1
Sharp-shinned hawk	0	0	0	0	1	0	0
Cooper's hawk	0	0	0	1	0	0	0
Red-tailed hawk	1	1	0	2	1	0	1
Turkey vulture	2	5	0	0	1	2	2
Osprey	3	0	1	3	2	5	4
Merlin	0	0	1	0	0	0	0
American kestrel	0	0	0	1	0	0	0
Peregrine falcon	2	0	2	2	0	4	1
Belted kingfisher	6	3	8	3	7	9	4
Bonaparte's gull	a	a	p	a	a	a	a
Mew gull	p	a	p	p	a	p	p
Herring gull	a	a	a	p	a	p	a
California gull	p	p	a	p	p	p	p
Western gull	p	p	p	p	p	p	p
Glaucous-winged gull	p	p	p	p	p	p	p

Source: White 1999

* Bird inventory conducted by White (1999) for Drakes Estero includes all bays, Drake's Spit, Sunset Beach and Outer Drake's Bay. The highest count for each species is in bold. Presence (p) or absence (a) of all other gull species is identified.

TABLE E-2. FEDERALLY LISTED PLANT SPECIES IN DRAKES BAY QUADRANGLE (NOT IMPACTED BY THE PROJECT)

Common Name	Scientific Name	Federal Status	State Status	CNPS Status
Beach Layia	<i>Layia carnosa</i>	endangered	endangered	1B
Sonoma Alopecurus	<i>Alopecurus aequalis</i> var. <i>sonomensis</i>	endangered	no current listing status	1B
Sonoma Spineflower	<i>Chorizanthe valida</i>	endangered	endangered	1B
Tidestrom's Lupine	<i>Lupinus tidestromii</i> var. <i>layneae</i>	endangered	endangered	1B

Source: USFWS 2010

TABLE E-3. RARE PLANT SPECIES (EXCLUDED DUE TO LACK OF HABITAT IN PROJECT AREA)

Common Name	Scientific Name	CNPS Listing*	Habitat Type
Beach Starwort	<i>Stellaria littoralis</i>	List 4.2	wetlands, coastal scrub, coastal dunes
Blasdale's Bent Grass	<i>Agrostis blasdalei</i>	List 1B.2	coastal scrub, dune, and grassland
Blue Coast Gilia	<i>Gilia capitata</i> ssp. <i>Chamissonis</i>	List 1B.1	coastal dunes, coastal scrub
Buxbaum's Sedge	<i>Carex buxbaumii</i>	List 4.2	wetlands
California Bottle-brush Grass	<i>Elymus californicus</i>	List 4.3	hardwood forest, coniferous forest, riparian woodland
Coast Lily	<i>Lilium maritimum</i>	List 1B.1	wetlands, grassland
Coast Rock Cress	<i>Arabis blepharophylla</i>	List 4.3	hardwood forest, coastal scrub, grassland
Coastal Bluff Morning-glory	<i>Calystegia purpurata</i> ssp. <i>Saxicola</i>	List 1B.2	coastal scrub and coastal dune
Coastal Marsh Milk-vetch	<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	List 1B.2	coastal scrub, dune, and wetlands
Curly-leaved Monardella	<i>Monardella undulate</i>	List 4.2	coniferous forest, coastal dunes, grassland, coastal scrub
Dark-eyed Gilia	<i>Gilia millefoliata</i>	List 1B.2	coastal dunes
Delta Mudwort	<i>Limosella subulata</i>	List 2.1	wetlands
Fragrant Fritillary	<i>Fritillaria liliacea</i>	List 1B.2	grassland, coastal scrub
Franciscan Thistle	<i>Cirsium andrewsii</i>	List 1B.2	hardwood forest, coastal scrub, grassland
Gairdner's Yampah	<i>Perideridia gairdneri</i> ssp. <i>Gairdneri</i>	List 4.2	grassland, coniferous forest
Glory Brush	<i>Ceanothus gloriosus</i> var. <i>exaltatus</i>	List 4.3	coastal scrub

Source: CNPS 2008

* Listing Nomenclature:

- List 1B - Plants rare, threatened, or endangered in California and elsewhere
- List 2 - Plants rare, threatened, or endangered in California but more common elsewhere
- List 3 - Plants needing more information, a review list
- List 4 - Plants of limited distribution, a watch list
- Threat Rank 0.1 – Seriously threatened in California
- Threat Rank 0.2 – Fairly threatened in California
- Threat Rank 0.3 – Not very threatened in California

TABLE E-3. RARE PLANT SPECIES (EXCLUDED DUE TO LACK OF HABITAT IN PROJECT AREA) (CONTINUED)

Common Name	Scientific Name	CNPS Listing*	Habitat Type
Harlequin Lotus	<i>Lotus formosissimus</i>	List 4.2	coastal scrub, grassland, wetlands
Humboldt Bay Owl's-clover	<i>Castilleja ambigua</i> ssp. <i>Humboldtiensis</i>	List 1B.2	wetlands
Large-flowered Leptosiphon	<i>Leptosiphon grandiflorus</i>	List 4.2	coastal scrub, bishop pine forest, coastal dunes, grassland
Lobb's Aquatic Buttercup	<i>Ranunculus lobbii</i>	List 4.2	coniferous forest, grassland, wetlands
Marin Checker Lily	<i>Fritillaria lanceolata</i> var. <i>tristullis</i>	List 1B.1	coastal scrub, grassland
Marin Knotweed	<i>Polygonum marinense</i>	List 3.1	wetlands
Marin Manzanita	<i>Arctostaphylos virgata</i>	List 1B.2	coastal scrub
Marsh Microseris	<i>Microseris paludosa</i>	List 1B.2	coniferous forest, grassland
Mt. Tamalpais Jewel-flower	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	List 1B.2	grassland, coastal scrub
Mt. Vision Ceanothus	<i>Ceanothus gloriosus</i> var. <i>porrectus</i>	List 1B.3	bishop pine forest, grassland, coastal scrub
Nodding Semaphore Grass	<i>Pleuropogon refractus</i>	List 4.2	coniferous forest, wetlands, grassland, riparian woodland
North Coast Phacelia	<i>Phacelia insularis</i> var. <i>continentis</i>	List 1B.2	coastal scrub, coastal dunes
Pale Yellow Hayfield Tarplant	<i>Hemizonia congesta</i> ssp. <i>Leucocephala</i>	List 3	coastal scrub, grassland
Perennial Goldfields	<i>Lasthenia californica</i> ssp. <i>Macrantha</i>	List 1B.2	coastal scrub, coastal dunes
Pink Sand-verbena	<i>Abronia umbellata</i> ssp. <i>breviflora</i>	List 1B.1	coastal dune
Point Reyes Bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	List 1B.2	wetlands
Point Reyes Ceanothus	<i>Ceanothus gloriosus</i> var. <i>gloriosus</i>	List 4.3	coastal scrub, bishop pine forest, coastal dunes
Point Reyes Checkerbloom	<i>Sidalcea calycosa</i> ssp. <i>Rhizomata</i>	List 1B.2	wetlands, grasslands
Point Reyes Horkelia	<i>Horkelia marinensis</i>	List 1B.2	coastal dunes, grassland, coastal scrub
Point Reyes Rein Orchid	<i>Piperia elegans</i> ssp. <i>Decurtata</i>	List 1B.1	coastal scrub
Rose Leptosiphon	<i>Leptosiphon rosaceus</i>	List 1B.1	coastal scrub, grassland
San Francisco Bay Spineflower	<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	List 1B.2	coastal scrub, coastal dunes, grassland
San Francisco Gumplant	<i>Grindelia hirsutula</i> var. <i>maritime</i>	List 1B.2	coastal scrub, grassland

Source: CNPS 2008

* Listing Nomenclature:

- List 1B - Plants rare, threatened, or endangered in California and elsewhere
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- Threat Rank 0.3 – Not very threatened in California

TABLE E-3. RARE PLANT SPECIES (EXCLUDED DUE TO LACK OF HABITAT IN PROJECT AREA) (CONTINUED)

Common Name	Scientific Name	CNPS Listing*	Habitat Type
San Francisco Owl's-clover	<i>Triphysaria floribunda</i>	List 1B.2	coastal scrub, grassland
San Francisco Wallflower	<i>Erysimum franciscanum</i>	List 4.2	coastal dunes, and scrub
Short-leaved Evax	<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>	List 2.2	coastal scrub, coastal dunes
Swamp Harebell	<i>Campanula californica</i>	List 1B.2	wetlands, grassland
Thurber's Reed Grass	<i>Calamagrostis crassiglumis</i>	List 2.1	coastal scrub, wetlands
Undescribed; Bolinas Ridge	<i>Ceanothus</i> ssp.	TBD	coastal scrub, grasslands
Western Leatherwood	<i>Dirca occidentalis</i>	List 1B.2	hardwood forest, coniferous forest, riparian woodland
Woolly-headed Spineflower	<i>Chorizanthe cuspidata</i> var. <i>villosa</i>	List 1B.2	coastal dunes, grassland, coastal scrub

Source: CNPS 2008

* Listing Nomenclature:

- List 1B - Plants rare, threatened, or endangered in California and elsewhere
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- Threat Rank 0.3 – Not very threatened in California

TABLE E-4. STATE-LISTED PLANT SPECIES (NOT IMPACTED BY THE PROJECT)

Common Name	Scientific Name	State Status	Habitat Type
Mason's Ceanothus	<i>Ceanothus masonii</i>	no current listing status	coastal scrub
Point Reyes Blenosperma	<i>Blennosperma nanum</i> var. <i>robustum</i>	no current listing status	grassland, coastal scrub
Pt. Reyes Meadowfoam	<i>Limnanthes douglasii</i> ssp. <i>Sulphurea</i>	endangered	grassland, wetlands
San Francisco Popcornflower	<i>Plagiobothrys diffusus</i>	endangered	grassland

Source: CNPS 2008

TABLE E-5. SPECIES OF CONCERN LISTED IN POINT REYES NATIONAL SEASHORE
(NOT IMPACTED BY THE PROJECT)

Common Name	Scientific Name
Allen's Hummingbird	<i>Selasphorus sasin</i>
American Bittern	<i>Botaurus lentiginosus</i>
Ashy Storm-petrel	<i>Oceanodroma homochroa</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
Black Rail	<i>Laterallus jamaicensis coturniculus</i>
Bumblebee Scarab Beetle	<i>Lichnanthe ursina</i>
Common Loon	<i>Gavia immer</i>
Ferruginous Hawk	<i>Buteo regalis</i>
Fringed Myotis Bat	<i>Myotis thysanodes</i>
Globose Dune Beetle	<i>Coelus globosus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Long-billed Curlew	<i>Numenius americanus</i>
Long-eared Myotis Bat	<i>Myotis evotis</i>
Long-legged Myotis Bat	<i>Myotis volans</i>
Marin Elfin Butterfly	<i>Incisalia mossii</i>
Nicklin's Peninsula Coast Range snail	<i>Helminthoglypta nickliniana awania</i>
Northwestern Pond Turtle	<i>Clemmys marmorata marmorata</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Opler's Longhorn Moth	<i>Adela oplerella</i>
Pacific Lamprey	<i>Lampetra tridentate</i>
Pacific Slope Flycatcher	<i>Empidonax difficilis</i>
Pacific Western Big-eared Bat	<i>Corynorhinus (Plecotus) townsendii townsendii</i>
Point Reyes Blue Butterfly	<i>Icaricia icaridides ssp</i>
Point Reyes Jumping Mouse	<i>Zapus trinotatus orarius</i>
Point Reyes Mountain Beaver	<i>Aplodontia rufa phaea</i>
Saltmarsh Yellowthroat	<i>Geothlypis trichas sinuosa</i>
Sandy Beach Tiger Beetle	<i>Cicindela hirticollis gravida</i>
Short-eared Owl	<i>Asio flammeus</i>
Sonoma Arctic Skipper	<i>Carterocephalus paleemon ssp</i>
Tomales Roach	<i>Lavinia symmetricus spp.</i>
Tricolored Blackbird	<i>Agelaius tricolor</i>
Vaux's Swift	<i>Chaetura vauxi</i>
White-tailed (=Black Shouldered) Kite	<i>Elanus leucurus</i>
William's Bronze Shoulderband Snail	<i>Helminthoglypta arrosa williamsi</i>
Yuma Myotis Bat	<i>Myotis yumanensis</i>

Source: NPS 2007a

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**COMMENTS AND RESPONSES ON THE DRAFT PLAN/
ENVIRONMENTAL IMPACT STATEMENT**



Final Environmental Impact Statement

Drakes Bay Oyster Company

Special Use Permit

Comments and Responses on the Draft Environmental Impact Statement

Point Reyes National Seashore

November 2012

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INTRODUCTION

Pursuant to the National Environmental Policy Act (NEPA), its implementing regulations, and National Park Service (NPS) guidance on meeting NEPA obligations, the NPS has reviewed and considered comments submitted on the *Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit* (Draft EIS). This report describes how the NPS considered public and agency comments and provides responses to the substantive comments received (see “Method of Comment Analysis” section for a definition of substantive comments).

The public comment period was announced by publication of the NPS notice of availability of the Draft EIS in the September 26, 2011 Federal Register; through the Seashore’s website (www.nps.gov/pore); through a newsletter sent to interested parties, elected officials, and appropriate local and state agencies; and through press releases. Following the announcement of the document’s availability and the distribution of the Draft EIS to agencies and the public, the comment period was open between September 26, 2011 and November 29, 2011. The public comment period was extended to December 9, 2011, in anticipation of the November 22, 2011 release of the final Marine Mammal Commission report on the impact of shellfish operations on harbor seals in Drakes Estero. The extension of the comment period was published by the U.S. Environmental Protection Agency in the Federal Register on November 25, 2011 and was announced in a press release on November 17, 2011.

A copy of the Draft EIS was posted on the NPS Planning, Environment, and Public Comment (PEPC) website at www.parkplanning.nps.gov/PORE. A news release announced the electronic availability of the Draft EIS on PEPC. The Draft EIS was also available in local public libraries, at the public meetings, and by contacting the Seashore Superintendent to request a printed copy or CD. The public was encouraged to submit comments on the Draft EIS through the NPS PEPC website, by mail delivery, or hand delivery to the Superintendent at the Seashore’s headquarters in Point Reyes Station, California. Oral statements and written comments were also accepted during the three open house public meetings, discussed below. Each submission received (a letter, oral statement, or comment directly entered into PEPC) is referred to as a correspondence. As explained in the Federal Register notice of availability for the Draft EIS, comments were not accepted by fax, email, or in any other way than those specified above. Also, as indicated in the Federal Register notice of availability, bulk comments in any format (hard copy or electronic) submitted on behalf of others were not accepted. Bulk comments received during the public comment period are not posted online nor reflected in this report. The term “comment” here is used to broadly refer to any type of correspondence containing comments on the Draft EIS, as more formally defined below.

There were multiple sets of comments not submitted correctly and not accepted in this process. Among those are:

- More than 4,000 from the Center of Biological Diversity
- More than 2,000 from Turtle Island Restoration Network
- Approximately 40 from an unaffiliated individual
- Approximately 40 from Alliance for Sustainable Agriculture
- More than 7,000 from Drakes Bay Oyster Company (DBOC)

Each group that submitted comments not accepted in this EIS process was notified, verbally in most cases, that their comments would not be accepted and provided with information on how to comment in

one of the acceptable ways, if time allowed. Those groups or individuals who submitted comments incorrectly at or after the close of the comment period may not have been notified.

PUBLIC OPEN HOUSES

In October 2011, three public open house meetings were held to continue the public involvement process and facilitate community feedback on the Draft EIS, in addition to the opportunities provided to submit written comments, as described above. The open houses were announced through news releases, on the PEPC website, and on the Seashore's website. Meeting times and locations for the three public meetings were as follows:

- Tuesday, October 18, 6:00-8:00 pm – Dance Palace Community Center, 503 B Street, Point Reyes Station, CA 94956
- Wednesday, October 19, 6:00-8:00 pm – Fort Mason Center, Building D, San Francisco, CA 94123
- Thursday, October 20, 6:00-8:00 pm – Tamalpais High School Student Center, 700 Miller Avenue, Mill Valley, CA 94941

A total of 247 attendees signed in during the three open house meetings. Some individuals attended more than one open house and are counted more than once in this total. Attendees were able to provide oral statements to planning team members stationed at flip charts located throughout the room. A Spanish language interpreter was available at each of the open house meetings. Planning team members wrote each comment on flip charts, which were posted on the wall for attendees to see and were entered into PEPC after the open houses were finished. All flipcharts from each night were added as a single correspondence to PEPC. Written public comments were also accepted at the open house meetings and entered into PEPC. NPS provided attendees with a fact sheet (available in both English and Spanish), which provided additional background on the project, the current status of the project, the EIS schedule, and information on how to participate in the EIS process, including how to get a copy of the Draft EIS and how to submit comments.

DEFINITION OF TERMS

Primary terms used in the document are defined below.

Substantive Comments: During coding, comments were classified as substantive or non-substantive. A substantive comment is defined in the NPS Director's Order #12 (DO-12; NPS 2001b) Handbook as a comment that does one or more of the following (DO-12 Handbook, section 4.6A):

- Question, with a reasonable basis, the accuracy of information presented in the EIS;
- Question, with a reasonable basis, the adequacy of the environmental analysis;
- Present reasonable alternatives other than those presented in the EIS; and/or
- Cause changes or revisions in the proposal.

As further stated in the DO-12 Handbook, substantive comments “raise, debate, or question a point of fact or policy” (NPS 2001b).

Non-substantive: Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive. The NPS read and considered all substantive and non-substantive comments in the process of preparing the Final EIS; however, non-substantive comments do not require a response.

Correspondence: A correspondence is the entire document received from a commenter. This includes letters, written comment forms, comments entered directly into PEPC, flip charts from the open houses, and any other written comments provided either at the public open houses, by postal mail, or in person at the park.

Comment: A comment is a portion of the text within a correspondence that addresses a single subject. It could include such information as an expression of support for or opposition to an alternative, additional data regarding the existing condition, or questions related to the impact analysis.

Code: A grouping centered on a common subject. The codes were developed based on the structure of the EIS and were used to track major subjects.

Concern: Concerns are statements that summarize the issues identified by each code. Each code was further characterized by concern statements to provide a better focus on the content of comments. Some codes required multiple concern statements, while others did not. In cases where no comments were received on an issue, the issue was not identified or discussed in this report.

Response: Responses are statements that summarize how the EIS has been revised to address the concern. In some cases, the requested information may already be present within the document, and the response will direct the reader the appropriate location.

METHOD OF COMMENT ANALYSIS

The NPS read and considered all substantive and non-substantive comments in the process of preparing the Final EIS. During the comment period, a total of 52,473 pieces of correspondence were received by one of the following methods: hard copy letter via mail or in-person delivery to the Seashore, oral or written statement provided at a public meeting, or entered directly into the NPS PEPC website. As stated in the Draft EIS Notice of Availability posted in the Federal Register, bulk comments (e.g., correspondence letters) submitted on behalf of others were not accepted. Bulk comments received during the public comment period are not posted online nor reflected in this report. All correspondence delivered by any of the approved methods were entered into the PEPC system for analysis. Each correspondence was read, and specific comments within each correspondence were identified. All comments were categorized by applying a series of codes that identify the general content of a comment and help to group similar comments together. A total of 98 codes were used to categorize all of the public comments received. An example of a code developed for this project is AL5000 – Alternative A. In some cases, the same comment may be categorized under more than one code, reflecting the fact that the comment may contain more than one issue or idea.

Once all the correspondence was entered into PEPC, each was read, and specific comments within each correspondence were identified. When identifying comments, every attempt was made to capture the full breadth of comments submitted.

There is no restriction on the number of times a person may comment on a NEPA process, and as previously noted, there were multiple people who commented multiple times, on all sides of this issue. Form letters were submitted on all sides of this issue. NPS's focus in this process is analyzing the comments received for content that informs the EIS. Comments that repeat the same message are responded to collectively in the Final EIS.

The correspondence received included several form letters. A total of 24 distinct form letters were received. The number of copies of each ranged from only a few to 15,870. Overall, 50,040 of the 52,473 pieces of correspondence received during the Draft EIS comment period were form letters. It should be noted that some pieces of correspondence included form letter text as well as additional language/comments that required further review and consideration. These letters were counted as unique correspondence, even though the letters included the form letter text. Each copy of a form letter is considered one piece of correspondence.

HOW WERE MY COMMENTS USED?

As described above, all substantive comments were categorized into concern statements, such as "Commenters requested additional detail regarding the impacts on socioeconomic resources under alternative A," and "Commenters expressed concern that issuance of a new Special Use Permit (SUP) could set a precedent."

A response was prepared for each concern statement. If changes to the Draft EIS were warranted to address a concern, the response provides a brief summary of how the Final EIS was changed to address that concern. If the information requested or suggested was already included in the Draft EIS, the response guides readers to the appropriate location(s) within the Final EIS. These concerns and the corresponding responses are listed in the Concern Response Report section of this report.

NEPA does not require identification to be provided or proven as a condition of providing public comments. All public comments received by the NPS in one of the acceptable methods described in the Notice of Availability were considered and treated equally. Public comment was only one of many factors considered by the decision maker when identifying the preferred alternative.

HOW DO I FIND MY CORRESPONDENCE?

All correspondence received during the public comment period are posted on the Drakes Bay Oyster Company Special User Permit Draft Environmental Impact Statement: Public Comments webpage (http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_deis_public_comments.htm). If you would like to find your individual correspondence, follow the steps below:

1. Use the *Correspondence ID by Author Report* (http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_deis_public_comments.htm) to look up the Correspondence ID for a particular author or organization. This report is organized by the alphabetically by organization or by author's last name.
2. Use the Correspondence ID to find the full correspondence in the list provided on the Public Comments website.

GUIDE TO THIS REPORT

This report is organized into the sections described below. The *Content Analysis Report* and the *Concern Response Report* are provided in the following sections of this document. For more information on how to find a particular correspondence, see the "How Do I Find My Correspondence?" instructions above.

Content Analysis Report: This is the basic report produced from PEPC that provides information on the numbers and types of comments received, organized by code and by various demographics. Tables F-1 and F-2 summarize the number of correspondence by geographic origin (both state and country). Table F-3 displays the number of correspondence by organization type (i.e., organizations, governments, individuals, etc.). Table F-4 lists correspondence distribution by substantive code. Table F-5 lists correspondence distribution by non-substantive code. Table F-6 displays the number of correspondence by correspondence type (i.e., amount of comments through PEPC, letters, etc.), respectively.

Concern Response Report: This report summarizes the comments received during the public comment period. In the report, comments are organized by codes and further organized into concern statements. A list of concern statements, in table format, is provided at the beginning of the *Concern Response Report* section for quick reference.

Correspondence ID by Author Report: This report cross-references the unique tracking number assigned to each piece of correspondence and the corresponding commenter name. The report is available on the park's website at:
http://www.nps.gov/pore/parkmgmt/planning_dboc_sup_deis_public_comments.htm.

CONTENT ANALYSIS REPORT

Table F-1. Correspondence Distribution by State

State	Percentage	Number of Correspondence
California	37.1 %	19,442
New York	6.6 %	3,483
Florida	4.6 %	2,392
Illinois	3.4 %	1,809
Texas	3.2 %	1,683
Washington	3.2 %	1,662
Colorado	2.7 %	1,424
New Jersey	2.5 %	1,329
Massachusetts	2.4 %	1,277
Oregon	2.4 %	1,257
Michigan	2.0 %	1,074
Ohio	2.0 %	1,065
Arizona	1.9 %	1,020
Pennsylvania	1.9 %	1,014
Virginia	1.8 %	942
North Carolina	1.7 %	912
Maryland	1.5 %	812
Wisconsin	1.4 %	730
Minnesota	1.4 %	716
Georgia	1.3 %	659
Connecticut	1.2 %	612
Missouri	1.1 %	551
New Mexico	1.0 %	549
Indiana	1.0 %	540
Tennessee	0.9 %	491
Nevada	0.6 %	333
Maine	0.5 %	288
Kentucky	0.5 %	261
Utah	0.5 %	260
New Hampshire	0.5 %	259
South Carolina	0.5 %	248
Iowa	0.5 %	247
Hawaii	0.5 %	247
Kansas	0.4 %	232

Table F-1. Correspondence Distribution by State (Continued)

State	Percentage	Number of Correspondence
Louisiana	0.4 %	211
Montana	0.4%	207
Alabama	0.4 %	184
Arkansas	0.3 %	183
Vermont	0.3 %	171
Oklahoma	0.3 %	168
Idaho	0.3 %	161
Alaska	0.3 %	152
Delaware	0.3 %	142
Nebraska	0.3 %	140
D.C.	0.3 %	139
Rhode Island	0.3 %	138
West Virginia	0.2 %	124
Unspecified	0.2 %	99
Mississippi	0.2 %	86
Wyoming	0.1 %	75
South Dakota	0.1 %	68
Virgin Islands	0.1 %	49
North Dakota	0.1 %	46
Puerto Rico	0.1 %	39
American Samoa	0.0 %	22
Northern Mariana Islands	0.0 %	13
Guam	0.0 %	12
Total	—	52,473

Table F-2. Correspondence Distribution by Country

Country	Percentage	Number of Correspondence
Australia	0.0 %	4
Malaysia	0.0 %	1
Spain	0.0 %	2
Austria	0.0 %	1
France	0.0 %	1
Chad	0.0 %	1
Brazil	0.0 %	3
Algeria	0.0 %	1
Great Britain	0.0 %	8
Chile	0.0 %	1
Kenya	0.0 %	1
Angola	0.0 %	1

Table F-2. Correspondence Distribution by Country (Continued)

Country	Percentage	Number of Correspondence
Sweden	0.0 %	1
USA	99.9 %	52,396
Italy	0.0 %	7
Tajikistan	0.0 %	1
Norway	0.0 %	1
Aruba	0.0 %	1
Netherlands	0.0 %	1
Germany	0.0 %	7
Burkina Faso	0.0 %	1
Indonesia	0.0 %	1
Slovenia	0.0 %	2
Belarus	0.0 %	1
Mongolia	0.0 %	1
Kiribati	0.0 %	1
Myanmar	0.0 %	1
Guinea	0.0 %	1
Denmark	0.0 %	1
Finland	0.0 %	1
Canada	0.0 %	12
Equatorial Guinea	0.0 %	1
New Zealand	0.0 %	1
Cape Verde	0.0 %	1
Hungary	0.0 %	1
Switzerland	0.0 %	1
Panama	0.0 %	1
Samoa	0.0 %	1
Niger	0.0 %	1
Unspecified	0.0 %	1
Albania	0.0 %	1
Total	—	52,473

Table F-3. Correspondence Count by Organization Type

Organization Type	Correspondences
Government	10
Business	20
Non-Profit/Organization	46
University/Professional Society	2
Unaffiliated Individual	52,395
Total	52,473

Table F-4. Correspondence Distribution by Substantive Code (Requires Response)

Code	Description	Correspondences
PN4000	Purpose, Need, Objectives	10
PN4100	Purpose and Need Issue: Precedence	243
PN5000	Authority Over Drakes Estero and Adjacent Lands	26
PN5100	State Management of Aquaculture Operations	1
PN5500	Purpose of Point Reyes National Seashore	43
PN5550	Purpose of Point Reyes National Seashore: Ranches	13
PN5600	Relationship to Other Laws, Policies, and Plans	12
PN5610	Relationship to Other Plans: GMP	117
PN5620	Relationship to Other Plans: Johnson Oyster Co EA (1998)	3
PN5630	Relationship to Other Policies: Aquaculture Law & Policy	99
PN5800	Establishment of Wilderness at Point Reyes National Seashore	50
PN5900	Commercial Shellfish Operations in Drakes Estero	10
PN6000	NEPA Process	13
PN7050	Impact Topic Dismissed: Vegetation	3
PN7100	Impact Topic Dismissed: Carbon Footprint	90
PN7150	Impact Topic Dismissed: Geologic Resources	1
PN7200	Impact Topic Dismissed: Cultural Resources	133
PN7300	Impact Topic Dismissed: Environmental Justice	12
PN7400	Impact Topic Dismissed: Local Food	187
PN9000	Ch 1: Editorial Changes	3
AL4000	Alternatives: Existing Conditions	5
AL5000	Alternative A	108
AL6000	Alternatives: Elements Common to All Action Alternatives	28
AL6100	Alternative B	2

Table F-4. Correspondence Distribution by Substantive Code (Requires Response) (Continued)

Code	Description	Correspondences
AL6300	Alternative D	3
AL7100	Alternatives: Dismissed - Open Shellfish Operations to Competitive Bid	3
AL7200	Alternatives: Dismissed - Relocate DBOC	6
AL7300	Alternatives: Dismissed - Alter SUP Term	45
AL7400	Alternatives: Dismissed - Issue a Renewable SUP	1,432
AL7600	Alternatives: Dismissed - Incorporate Phase Out Requirements in New SUP	2
AL7700	Alternatives: Dismissed - Comprehensive Restoration of the Developed Onshore Area	2
AL8000	Alternatives: New Elements or Alternatives	17
AL8190	New Alternative: Collaborative Management	1,750
AL6000	Alternatives: Elements Common to All Action Alternatives	28
AL10000	Alternatives: Preferred Alternative	4
AL11000	Alternatives: Environmentally Preferable Alternative	27
AL12000	Alternatives: General Comments	7
AL12200	Alternatives: Mitigation	10
AE1000	Affected Environment: General Comments	1
AE2000	Affected Environment: Drakes Estero Setting and Processes	2
IA1000	Impact Analysis: General Comments	290
IA1100	Impact Analysis: Shell Donation	61
IA2000	Impact Analysis: General Methodology for Assessing Impacts	9
IA2200	Impact Methodology: Baseline for Analysis	6
IA2500	Impact Analysis: References Used for Assessing Impacts	43
IA3200	Impact Analysis: Climate Change	7
IA3300	Impact Analysis: Water Quantity	1
IA3400	Impact Analysis: Invasive Species	1
IA4000	Impact Analysis: Cumulative Impacts	4
IA4200	Cumulative Impacts: Kayaking	16
IA4250	Cumulative Impacts: Monitoring/Management of Invasive Species	7
IA4300	Cumulative Impacts: Ranching	28
IA4350	Cumulative Impacts: Human-caused Noise Sources	3
IA4500	Cumulative Impacts: Ocean Acidification	1
IA4600	Cumulative Impacts: Marine Life Protection Act Initiative	1
IM1000	Impairment	2
BE1000	Wildlife and Wildlife Habitat - Benthic Fauna: Affected Environment	8
BE2000	Wildlife and Wildlife Habitat - Benthic Fauna: Impact of Alternatives	25
BI1000	Wildlife and Wildlife Habitat - Birds: Affected Environment	3
BI2000	Wildlife and Wildlife Habitat - Birds: Impact of Alternatives	18
EE1000	Eelgrass: Affected Environment	4
EE2000	Eelgrass: Impact of Alternatives	36

Table F-4. Correspondence Distribution by Substantive Code (Requires Response) (Continued)

Code	Description	Correspondences
FI1000	Wildlife and Wildlife Habitat - Fish: Affected Environment	3
FI2000	Wildlife and Wildlife Habitat - Fish: Impact of Alternatives	8
FZ1000	Coastal Flood Zones: Affected Environment	1
FZ2000	Coastal Flood Zones: Impact of Alternatives	1
HS1000	Wildlife and Wildlife Habitat - Harbor Seals: Affected Environment	7
HS2000	Wildlife and Wildlife Habitat - Harbor Seals: Impact of Alternatives	128
HS2100	Harbor Seals: Use of Photographs	19
HS2200	Harbor Seals: Use of Becker 2011	9
OP1000	NPS Operations: Affected Environment	3
OP2000	NPS Operations: Impact of Alternatives	9
SE1000	Socioeconomic Resources: Affected Environment	11
SE2000	Socioeconomic Resources: Impact of Alternatives	188
SP1000	Special-Status Species: Affected Environment	42
SP2000	Special-Status Species: Impact of Alternatives	117
SS2000	Soundscapes: Impact of Alternatives	7
VE1000	Visitor Experience and Recreation: Affected Environment	22
VE2000	Visitor Experience and Recreation: Impact of Alternatives	59
WE1000	Wetlands and Waters of the U.S.: Affected Environment	3
WE2000	Wetlands and Waters of the U.S.: Impact of Alternatives	9
WI1000	Wilderness: Affected Environment	2
WI2000	Wilderness: Impact of Alternatives	31
WQ1000	Water Quality: Affected Environment	5
WQ2000	Water Quality: Impact of Alternatives	92
CC1000	Consultation and Coordination: Cooperating Agencies	1
CC3000	Consultation and Coordination: Public Outreach and Involvement	4
RF1000	Suggested References	93

Note: Each correspondence may have multiple codes. As a result, the total number of correspondence may be different than the actual comment totals

**Table F-5. Correspondence Distribution by Non-Substantive Code
(Does Not Require a Response)**

Code	Description	Correspondences
AL12090	Alternatives: General Comments	38
AL5900	Alternative A: Do Not Issue SUP (Support)	48485
AL6090	Alternatives: Issue New SUP (Generic Support)	587
AL6091	Alternatives: Issue New SUP (Support Alternatives B and D)	4
AL6190	Alternatives: Issue New SUP (Support Alternative B)	6
AL6290	Alternatives: Issue New SUP (Support Alternative C)	4
AL6390	Alternatives: Issue New SUP (Support Alternative D)	31
CC3100	Consultation and Coordination: Public Meetings	25
DU1000	Duplicate Correspondence/Duplicate Comment	300
GC1000	General Concerns	340
IA1090	Impact Analysis: General Comments	113
OS1000	Outside Scope	51
PN9000	Ch 1: Editorial Changes	4
DU	Duplicate Correspondence/Duplicate Comment	90

Note: Each correspondence may have multiple codes. As a result, the total number of correspondence may be different than the actual comment totals

Table F-6. Correspondence Distribution by Correspondence Type

Type	Correspondences
Web Form	51,526
Letter	879
Park Form	65
Other (Flip charts from public meetings)	3
Total	52,473

CONCERN RESPONSE REPORT

As described above, this report summarizes the comments received during the public comment period for the Drakes Bay Oyster Company Draft EIS, provides a concise list of concern statements by code, and provides the responses to each of those concern statements.

PN4000 - Purpose, Need, Objectives

Concern Statement 35894	Commenters requested that the purpose of and need for this action include DBOC's goals and objectives.
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NPS Response to Concern Statement 35894:

As noted in the EIS, the need for action relates to section 124, which provides the Secretary with authority “notwithstanding any other provision of law.” While the Department of the Interior has decided to prepare an EIS and generally use the procedures of NEPA to help inform the decision, it is doing so as a matter of discretion under section 124.

The DOI’s NEPA regulations, found at 43 Code of Federal Regulations (CFR) Part 46, address the formulation of purpose and need statements in NEPA documents that are prepared in response to permit applications. The Department of the Interior (DOI) NEPA regulations state that,

“When a bureau is asked to approve an application or permit, the bureau should consider the needs and goals of the parties involved in the application or permit as well as the public interest. The needs and goals of the parties involved in the application or permit may be described as background information. However, this description must not be confused with the bureau’s purpose and need for action. It is the bureau’s purpose and need for action that will determine the range of alternatives and provide a basis for the selection of an alternative in a decision” (43 CFR 46.420).

Text has been added to the chapter 1 (page 6) of the Final EIS describing DBOC’s goals, such as DBOC’s wishes to obtain a new SUP with the same terms and conditions as in the reservation of use and occupancy (RUO) and existing SUP, that DBOC would like permission to complete improvements considered in the 1998 Environmental Assessment (EA), and that DBOC would like to construct additional physical improvements. These objectives have not been added to the NPS purpose and need statement because doing so would limit the range of reasonable alternatives to only those that further DBOC’s goals, which would come at the expense of the broader public interest, and would be inconsistent with the Secretary’s discretion under section 124. The purpose and need statement in the Final EIS and the project objectives properly focus on the broader public interest. It should also be noted that the purpose and need statement as drafted has allowed NPS to consider an alternative (alternative D) that includes the new development requested by DBOC.

Concern Statement 35895	<p>Commenters requested that the project objectives be revised to include the following items:</p> <ul style="list-style-type: none"> -emphasis on preservation of natural resources -management consistent with the General Management Plan (GMP) -management consistent with the Seashore's enabling legislation -preservation of the Seashore's natural and cultural resources for future generations -manage the Seashore's pastoral zone consistent with the goals of the policies supporting increasing the supply of seafood -retain and expand interpretive services provided by DBOC -retain and improve affordable housing
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NPS Response to Concern Statement 35895:

Project objectives build from the project purpose and identify those goals that are “critical to meet if NPS is to consider the proposal successful” (NPS 2001b). Project objectives should be grounded in the park’s enabling legislation, purpose, significance, and mission goals; as well as relevant legislation, plans (such as GMPs) or other NPS standards and guidelines. The project objectives, as currently written, provide the basic goals that the project must address, as related to the park purpose for the Drakes Estero area: manage natural and cultural resources to support their protection, relocation, and prevention; manage, wilderness and potential wilderness to preserve the character and qualities for which they were designated, and provide opportunities for visitor use and enjoyment of park resources. Project objectives should be broad enough to allow for a reasonable range of alternatives without narrowing the focus or intentionally excluding an alternative.

Two of the proposed suggestions (emphasis on natural resources, preservation of the Seashore’s natural and cultural resources for future generations) were included as a project objective in the Final EIS (see “Project Objectives” on page 5). Management consistent with the GMP and the Seashore’s enabling legislation is assumed because the Seashore must adhere to NPS guidance. However, the Secretary’s decision, as allowed by section 124, may be contrary to the park’s enabling legislation and approved GMP. A description of the Purpose and Significance of Point Reyes National Seashore is provided on pages 14-16 of the EIS, and the relationship to the GMP is provided on pages 65-66.

The suggested objectives related to increasing the supply of seafood, retaining and expanding interpretive services provided by DBOC, and retaining and improving affordable housing are not applicable to this project because they are not grounded in the park’s enabling legislation, purpose, significance, or mission goals for the Drakes Estero area. More specifically, the mission of the NPS is to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.

Concern Statement 36942	<p>A commenter stated that the project need is based solely on Paragraph 11 of the RUO; DBOC's only need is for a SUP from the NPS to run concurrently with their existing California Department of Fish and Game (CDFG) lease (which does not expire until 2029).</p>
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NPS Response to Concern Statement 36942:

Paragraph 11 of the RUO is discretionary and for the reasons specified below does not provide a basis for issuing a SUP to DBOC. Further, Paragraph 11 of the RUO states that any SUP issued following expiration of the reserved term, “will be issued in accordance with National Park Service regulations in effect at the time the reservation expires.”

Had Congress not enacted section 124, the NPS would not have been able to issue a SUP to DBOC after November 30, 2012. NPS regulations generally prohibit business operations in units of the National Park System, except where authorized by a “permit, contract, or other written agreement with the United States.” 36 CFR 5.3. Once the RUO expired, DBOC would not have had a contract or other written agreement, and in any event Paragraph 11 of the expiring RUO only provides for the possibility of a SUP. NPS issuance of SUP is normally governed by Director’s Order 53, Special Park Uses (DO 53; NPS 2010i), and its’ accompanying Reference Manual.

Under DO 53, the NPS may only issue SUPs for temporary occupancy for up to two years after a RUO expires (See DO 53 Reference Manual, Appendix. 14.). Such permits may only be issued under certain limited circumstances, such as historic significance, extreme environmental conditions, or undue hardship in the case of a primary residence. DBOC’s desire to conduct an ongoing commercial operation cannot be accommodated under any of these limited exceptions. This means it can only be accommodated under specific overriding legislative authority, which means that the terms of any such permit will depend on section 124, not the RUO.

Moreover, the geographic extent of a SUP issued under the RUO would be limited to the area encompassed by the RUO. The onshore RUO area excludes DBOC’s setting tanks, the work platform near the dock, storage sheds, the office trailer and one of the mobile residence structures. (see figure 2.3.) DBOC’s only access to these structures is by virtue of the 2008 SUP. A permit limited to the RUO boundary would not include areas necessary to DBOC’s operation.

For these reasons, the issuance of a SUP to DBOC is controlled by section 124, not Paragraph 11 of the RUO. Section 124 states that a new permit must include the same terms and conditions as the “existing authorization” which is defined as the RUO and the 2008 SUP. (“Prior to the expiration on November 30, 2012 of the Drake’s Bay Oyster Company’s Reservation of Use and Occupancy and associated special use permit [‘existing authorization’] ... the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization...”) Alternatives B, C and D consider issuance of a SUP to DBOC that conforms to the discretionary authority granted in section 124.

PN4100 - Purpose and Need Issue: Precedence

<p>Concern Statement 35896</p>	<p>Commenters expressed concern that issuance of a new SUP could set a precedent in the following ways:</p> <ul style="list-style-type: none"> -allowing commercial use (or other activities inconsistent with wilderness) within congressionally designated potential wilderness -intentional introduction of exotic species to wilderness areas -weakening or nullifying other existing leases on federal land
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NPS Response to Concern Statement 35896:

These comments generally appear to be directed at the permit authority given to the Secretary under section 124, rather than the impacts or specific alternatives being analyzed in this EIS. Moreover, whether or not issuance of a permit to DBOC would set a legal or policy precedent for other units of the national park system or other wilderness areas is generally beyond the scope of this EIS.

In relevant part, section 124 provides, “[N]othing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore.” It is unclear how a statutory prohibition on citation as precedent could be enforced. It is clear, however, that section 124 does not provide authority for issuing permits to commercial operations in other units of the national park system, because section 124 does not have “application to any location other than Point Reyes.”

Section 124 could nonetheless still act as a precedent for similar future legislation that might allow otherwise prohibited activities in a wilderness area or in a national park unit, and a decision to grant a permit to DBOC under section 124 might reinforce any such precedent.

PN5000 - Authority Over Drakes Estero and Adjacent Lands

Concern Statement 35897	Commenters requested confirmation that NPS was provided with first right of refusal and stated that such a right remains valid.
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NPS Response to Concern Statement 35897:

Paragraph 14 of the RUO states “should the vendor elect to dispose of any unused portion of the remainder of its reserved occupancy, the United States of America shall be afforded a right of first refusal to acquire the same.” Documents show that the NPS was notified of the transfer of the RUO. At that time the NPS did not exercise paragraph 14 of the RUO or contest the transfer of the remaining 7-year term from Johnson’s Oyster Company to DBOC.

Concern Statement 36946	<p>Commenters stated that CDFG has primary jurisdiction over Drakes Estero and/or requested clarification on the following items related to CDFG's authority in Drakes Estero:</p> <ul style="list-style-type: none"> -does NPS consider DBOC's past, present, or future CDFG leases to be lawful? -what are the differences in jurisdiction between state and federal management of Drakes Estero? -what is the NPS justification for claiming the state relinquished jurisdiction over Drakes Estero, specifically in light of the state's reserved right to fish? -what specific sections of the CDFG lease would be incorporated in the new SUP?
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NPS Response Concern Statement 36946:

CDFG is a cooperating agency for this EIS. Throughout the process of developing the EIS, the NPS has worked with CDFG to clarify the division of roles and responsibilities over DBOC’s operation should a new NPS permit be issued to DBOC. The EIS explains the effect of the 1965 Act conveying the water bottoms in Drakes Estero to the United States. As explained in the EIS, the 1965 Act did not reserve to the State of California the authority to issue aquaculture leases in the Estero. The legal authority to determine whether DBOC may use the water bottoms in the Estero rests with the NPS, not the CFGC. Although the CFGC does not have leasing authority for the water bottoms in the Estero, CDFG would continue to regulate many aspects of DBOC’s operation. This future realignment of NPS’s and CDFG’s roles and

responsibilities over DBOC reflects correspondence on this matter as well as more recent discussions between the two agencies, and information received from the California State Lands Commission (SLC). Additional detail about this correspondence is provided in the Final EIS on pages 6-9.

The SLC is the agency in California that has jurisdiction over sovereign lands, including tide and submerged lands, within the state. The SLC has issued an opinion regarding the extent of the state’s authority over DBOC’s operations in the Estero. In a letter dated July 26, 2007 following a meeting with DBOC and others, the SLC concluded that the 1965 conveyance divested the state of any real property interest in the tide and submerged lands in Drakes Estero except for the mineral estate. The SLC also concluded that the “right to fish” as reserved by the state in the 1965 conveyance pertains to the taking and capturing of fish from the wild, not aquaculture.

The NPS, not the CFGC, has the legal authority to determine whether DBOC may occupy water bottoms in Drakes Estero for its operation. The action alternatives in this EIS reflect the realignment of NPS’s and CDFG’s roles and responsibilities with regard to DBOC’s operation. Should the Secretary issue a new SUP to DBOC, DBOC would no longer operate under a state water bottom lease from the Fish and Game Commission. Relevant provisions of the existing CDFG permit would be incorporated into the SUP including repair and cleanup requirements, payment requirements, the maintenance of an escrow account as “a financial guarantee of growing structure removal and/or cleanup expense in the event the lease is abandoned or otherwise terminated”, and rights of inspection (including premises, equipment and books pertaining to the cultivation on the leased premises).

Although DBOC would no longer operate pursuant to a state water bottom lease, DBOC would still be subject to regulation by CDFG as set forth in CDFG’s 2008 letter. CDFG would not continue to collect “payment of taxes and fees.” The privilege use tax is tied to the lease and is a part of the lease. In granted tidelands, the leasing authority (not CDFG) determines whether and what the rate is. The basis for fee collection for any SUP issued by NPS in Drakes Estero would be based on the findings of the DOI-Office of Valuation Services appraisal. The aquaculture operation would still be required to hold an annual Aquacultural Registration from CDFG (State Fish and Game Code 15101). This is typical of all aquacultural operations on private or granted tidelands. The role of CDFG would include Aquaculture Registration, import of aquatic organisms (CDFG live aquatic importation permit is required), and disease control.

Finally, some commenters have asked NPS to clarify whether the state ever had leasing authority over shellfish operations in the Estero. Prior to the 1965 conveyance of the tide and submerged lands in Drakes Estero to the United States, the State of California had leasing authority over the commercial shellfish operation in the Estero. Following the 1965 conveyance of the tide and submerged lands to the United States, the NPS allowed the state water bottom lease to remain in effect because both the NPS and the CDFG believed at that time that the state’s reserved “right to fish” included the management and leasing of state water bottoms for aquaculture. This belief, although erroneous, is reflected in some letters between the NPS and CDFG from 1965 and 1966 and in some NPS documents from the early 1970s. The recent analysis by NPS, the Office of the Solicitor, and the SLC confirm that this earlier interpretation was incorrect.

<p>Concern Statement 36952</p>	<p>A commenter stated that NPS policies are not legally binding unless formalized via rulemaking.</p>
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NPS Response to Concern Statement 36952:

The commenter is correct that policies differ from regulations. It is true that NPS policies are not legally binding, in the sense that they are not enforced directly against park visitors, and that third parties cannot sue NPS in court over alleged violations of policy. But adherence to NPS policies is mandatory for NPS employees when they make management decisions. The courts have generally held that they will defer to decisions that are properly made pursuant to those policies. An analysis of how the alternatives conform to NPS policies is therefore appropriate in this EIS.

The NPS policies referenced in the EIS primarily include those contained in the NPS's *Management Policies 2006*. The Management Policies were adopted following public comment that involved input from more than 45,000 commenters during a 127 day public comment period. The Management Policies are the "highest of three levels of guidance documents in the NPS Directives System" (NPS 2006d).

The Management Policies apply to all management decisions affecting units of the National Park System such as Point Reyes. A decision to issue a SUP is a management decision affecting a park area.

Adherence to directives contained in the Management Policies is "mandatory unless specifically waived or modified by the Secretary, the Assistant Secretary or the Director." (NPS 2006d). In addition, section 124 provides the Secretary with express authority to issue a SUP to DBOC "notwithstanding any other provision of law." As a result, NPS's Management Policies remain relevant to the action alternatives considered in this EIS, and it is appropriate for the EIS to analyze the degree to which issuance of a SUP would conform to existing NPS policies.

Concern Statement 36953	Commenters stated that the current SUP applies only to the onshore elements of DBOC's operations, not the offshore elements.
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NPS Response to Concern Statement 36953:

The 2008 SUP applies to both the onshore and offshore areas used by DBOC for the cultivation and processing of shellfish. The geographic areas included in the 2008 SUP are depicted on the maps attached to the SUP.

NPS also notes that section 124 provides that if the Secretary decides to issue a SUP to DBOC, the new SUP must have the "same terms and conditions as the existing authorization." Section 124 defines the term "existing authorization" as the "Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit."

With regard to the comment that the state's retained right to fish precludes NPS from exercising control over DBOC's operations in the Estero. Please see concern statement 36946.

PN5500 - Purpose of Point Reyes National Seashore

Concern Statement 35907	Commenters stated that commercial shellfish operations are compatible with the Seashore's purpose (and not incompatible with wilderness), citing the enabling legislation, intent, Conservation and Stewardship Publication #14, and personal opinion.
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NPS Response Concern Statement 35907:

The Seashore’s enabling legislation does not authorize aquaculture. See the “Purpose and Significance of Point Reyes National Seashore” section on pages 14-16 of the Final EIS for a description of the park purpose and significance, as well as a definition of “ranching and dairying purposes,” as indicated in the park legislation. A discussion on the compatibility of aquaculture operations within congressionally designated wilderness areas (including potential wilderness) is provided in the “Establishment of Wilderness at Point Reyes National Seashore” section on pages 16-18 of the Final EIS.

Concern Statement 36959	Commenters stated that commercial shellfish operations are not consistent with the purpose of the Seashore, citing NPS goals and policies, the Wilderness Act, and the Point Reyes Wilderness Act.
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NPS Response to Concern Statement 36959:

The Seashore’s enabling legislation does not authorize aquaculture. See the “Purpose and Significance of Point Reyes National Seashore” section on pages 14-16 of the Final EIS for a description of the park purpose and significance, as well as a definition of “ranching and dairying purposes,” as indicated in the park legislation. A discussion on the compatibility of aquaculture operations within congressionally designated wilderness areas (including potential wilderness) is provided in the “Establishment of Wilderness at Point Reyes National Seashore” section on pages 16-18 of the Final EIS.

PN5550 - Purpose of Point Reyes National Seashore: Ranches

Concern Statement 35969	Commenters expressed concern about inconsistency and the impact on the SUPs held by the ranches if a new SUP is not issued to DBOC.
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NPS Response to Concern Statement 35969:

Continuation of ranching and dairy operations in Point Reyes National Seashore is legislatively authorized. The decision on the DBOC SUP will not affect this. See pages 14-16 (“Purpose and Significance of Point Reyes National Seashore”) of the Final EIS for more information.

The Final EIS includes Map NS-PR-7002 of the pastoral zone that was referenced in the Seashore enabling legislation. Despite the presence of Johnson’s Oyster Company at the time of this legislation, Drakes Estero and an upland buffer including the oyster operation were not identified as part of the pastoral zone. In 1976, Congress established the Point Reyes Wilderness, including the designation of the Drakes Estero waters as potential wilderness.

Current land management is consistent with 1980 GMP land management zoning for Wilderness, natural zone and pastoral zone areas. The 1980 GMP identifies a “Special Use Zone” and within that area defines four subzones including “Pastoral Lands,” Radio Range Station,” “Oyster Farm,” and “Lands Not to be Acquired.” The Pastoral lands subzone permits “the continued use of the existing ranchlands for ranching and dairying purposes” (NPS 1980). Areas identified in the 1980 GMP as within the pastoral zone, continue under agricultural operations, with minor adjustments for resource protection and other purposes. The 1980 GMP clearly identifies the waters of Drakes Estero as within the Wilderness sub-zone and identifies a separate, “Oyster Farm” special use zone at the location of the upland facilities, and separate from the pastoral zone. At the time the GMP was issued, the RUO authority was still valid for another 32 years.

PN5600 - Relationship to Other Laws, Policies, and Plans

Concern Statement 35911	<p>Commenters requested that additional relevant law, policies, and/or plans be considered in the EIS, including the following:</p> <ul style="list-style-type: none"> -Marin County's planning process and policies -California Environmental Quality Act (CEQA) -California Aquatic Invasive Species Management Plan -National Sea Grant Program -Executive Order 13112 -Beach Act -Clean Water Act -Coastal Zone Act Pollution Prevention Act -Resource Conservation and Recovery Act -Marine Plastic Pollution Research and Control Act -Marine Debris, Research, Prevention and Reduction Act -Shore Protection Act -Marine Protection, Research, and Sanctuaries Act
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NPS Response to Concern Statement 35911:

The Final EIS lists and explains the relevant authorities on pages 6-9. State authorities, while they are discussed in the EIS where instructive, are not generally applicable to federal actions. None of the other authorities cited here were found sufficiently relevant to the decision under section 124 or its impacts to warrant discussion.

Concern Statement 36924	<p>A commenter requested that “take” under the Marine Mammal Protection Act and Marine Life Protection Act be defined.</p>
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NPS Response to Concern Statement 36924:

The definition of take under the Marine Mammal Protection Act is provided on page 57 of the Final EIS. The definition of take under the Marine Life Protection Act has been added to page 63 of the Final EIS. It is the responsibility of the enforcing agency to determine whether “take” of marine organisms has occurred.

Concern Statement 36926	<p>A commenter stated that DBOC activities are inconsistent with the requirements of the Wilderness Act because it cannot be shown that the oyster operation supports or enhances the wilderness character or expressly benefits the coastal wilderness qualities for which Point Reyes was initially protected.</p>
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NPS Response to Concern Statement 36926:

The NPS acknowledges that authorizing DBOC to continue its operations would not be consistent with certain provisions of the Wilderness Act, nor NPS *Management Policies 2006*. However, the Secretary is authorized under section 124 to issue a new SUP “notwithstanding any other law or policy,” which includes the Wilderness Act. If a 10-year permit is issued, the NPS would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness until 2022. Regardless of the alternative selected, the NPS would continue to be subject to the minimum requirements analysis for all administrative actions, consistent with management of potential wilderness areas as prescribed by NPS *Management Policies 2006* (NPS 2006d, section 6.3.1).

Please see related response to concern 36233 regarding impacts on wilderness.

PN5610 - Relationship to Other Plans: GMP

Concern Statement 35915	<p>Commenters requested additional detail or clarification regarding the relationship of this project to the Seashore's GMP, specifically:</p> <ul style="list-style-type: none"> -the GMP supports the continued presence of commercial oyster operations in Drakes Estero -what is the justification for going against the support expressed in the GMP? -what is the status of a new GMP and how will it address this situation?
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NPS Response to Concern Statement 35915:

The relationship of the alternatives considered in this EIS to the Seashore's existing and future GMPs is described on pages 45-46 of the Final EIS.

The existing General Management Plan was completed in 1980. At that time, the RUO for the oyster operation had a remaining term of 32 years, until November 30, 2012. It was therefore appropriate for the GMP to include objectives for NPS management and oversight of the commercial oyster company during this period. One of the GMP's objectives in this regard was to monitor and improve maricultural operations. Planning objectives, however, do not change legal requirements. As explained in the response to concern 36968, absent the enactment of section 124, the NPS did not have authority to extend the RUO beyond 2012. The objective expressed in 1980 of monitoring and improving shellfish operations did not change the fact that NPS did not, at that time, have the authority to extend the oyster operation beyond 2012.

The Secretary's decision with regard to the future of DBOC's operation will be reflected in the forthcoming GMP.

PN5620 - Relationship to Other Plans: Johnson Oyster Co EA (1998)

Concern Statement 35917	<p>Commenters question why the analyses in the EIS are different from the Environmental Assessment conducted for improvements at the Johnson Oyster Company in 1998.</p>
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NPS Response to Concern Statement 35917:

In 2003, as a result of the ongoing and unresolved violations, and lack of response by the Johnson Oyster Company, the NPS revoked any authority for construction and replacement activities authorized by the 1998 EA and FONSI (NPS 2003c). Therefore, actions considered in the 1998 NEPA process that had not been completed prior to the NPS's revocation of the FONSI in 2003 are being reviewed in this EIS in accordance with existing NPS policies and procedures.

PN5630 - Relationship to Other Policies: Aquaculture Law & Policy

Concern Statement 36071	<p>Commenters requested that federal and state aquaculture laws and policies be considered as relevant to the discussion in the EIS, including the following:</p> <ul style="list-style-type: none"> -Department of Commerce Aquaculture Policy of 2011 -National Oceanic and Atmospheric Administration's (NOAA) Marine Aquaculture Policy -National Aquaculture Act of 1980 -Department of Commerce National Shellfish Initiative
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NPS Response to Concern Statement 36071:

The National Aquaculture Act of 1980 (Act) does not identify the National Park Service as having responsibility for programs related to aquaculture, and, therefore, have not been added to the relevant laws and policies section of the EIS. Rather, the Act states a general policy of encouraging the development of aquaculture in the United States. The Act required the publication of a National Aquaculture Development Plan to recommend actions that should be taken to further the policies of the Act. This plan was issued in 1983. The 1983 National Aquaculture Plan does not identify national park units as suitable locations for the enhancement of aquaculture opportunities or research. The only agencies within the Department of the Interior that are identified in the plan are the U.S. Fish and Wildlife Service, the Office of Territorial Affairs (now the Office of Insular Affairs), and the Bureau of Indian Affairs.

Aquaculture policies issued by the Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA) have not been added to the relevant laws section of the EIS because these policies do not apply to the National Park Service. For example, NOAA's aquaculture policy states, "[T]he purpose of this policy is to enable the development of sustainable marine aquaculture within the context of the National Oceanic and Atmospheric Administration's (NOAA) multiple stewardship missions and broader social and economic goals." The policy further states that, "[F]ederal support, engagement, and authorities related to aquaculture development span a number of agencies, in particular the Food and Drug Administration, Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, and the U.S. Department of Agriculture. These agencies collaborate with each other, industry, states, and academia to address issues related to aquaculture facilities and to promote the development of new technologies that improve the sustainability of the industry." As these provisions demonstrate, the Department of Commerce and NOAA aquaculture policies do not apply to the National Park Service, nor do they envision the development of aquaculture within national parks.

The same is true of NOAA's National Shellfish Initiative. The Initiative sets forth actions that NOAA will undertake with regard to the development of the aquaculture industry and related research. The National Shellfish Initiative does not encourage the development of aquaculture operations in national parks.

Although DOC and NOAA policies referenced in the comments do not apply to the NPS, the NPS requested that NOAA participate in the EIS as a cooperating agency. NOAA-NMFS has regulatory and enforcement requirements under the Magnuson-Stevens Fishery Management Act (Essential Fish Habitat), Marine Mammal Protection Act (MMPA), and Endangered Species Act (coho salmon and steelhead). NOAA agreed to become a cooperating agency and has provided comments on the EIS.

Finally, commenters requested that state and local plans regarding agriculture and aquaculture be addressed in the EIS. Local plans such as these do not apply to lands owned and managed by the United States unless Congress has directed otherwise. The only state plan that is relevant to the alternatives considered in the EIS is the state's coastal management program. Under the federal Coastal Zone Management Act, federal actions involving the issuance of permits are subject to the state's consistency certification process. This process considers the consistency of the permitting action with enforceable policies contained in the state's coastal program. The state's coastal program includes enforceable policies relating to public access, recreation, the marine environment, agricultural lands, and development. The National Park Service is coordinating with the California Coastal Commission on the consistency certification process.

PN5800 - Establishment of Wilderness at Point Reyes National Seashore

<p>Concern Statement 35920</p>	<p>Commenters stated that Drakes Estero does not qualify as wilderness for the following reasons:</p> <ul style="list-style-type: none"> -use of the area by Native Americans -the area should be considered "trammeled" -use by visitors -the area was never intended to be wilderness -surrounded by ranches
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NPS Response to Concern Statement 35920:

Commenters raised a number of concerns related to the qualification of the area as wilderness because of past land uses, surrounding land uses, and the levels of use by the public. Wilderness is a land management designation placed on an area by congressional action. Congress established the Point Reyes Wilderness in October 1976 (PL 94-544 and PL 94-567), culminating five years of planning and public hearings. Similar land uses were present at the time of these deliberations. Section 3 of PL 94-567 establishes that potential wilderness can be designated wilderness by notice in the Federal Register that all nonconforming uses have ceased. The EIS delineates the Congressionally established boundaries of wilderness, including potential wilderness within the project area.

It is the obligation of the NPS to manage areas designated by Congress as wilderness, consistent with the Wilderness Act and NPS *Management Policies 2006*. Past land uses or surrounding land uses do not affect the ability of Congress to designate an area as wilderness, nor the obligation of the NPS to manage those Congressionally-designated areas as wilderness. The NPS, by its management policies (NPS 2006d, section 6.3.1) is required to manage potential wilderness as wilderness with the exception of any ongoing nonconforming use.

<p>Concern Statement 36968</p>	<p>Commenters requested additional information and/or reflected upon the original intent of wilderness management within the Seashore with the following specific issues in mind:</p> <ul style="list-style-type: none"> -was the original intent to exclude commercial shellfish operations? -is NPS obligated to refuse a new SUP as stated in the 2004 solicitor's opinion? -does the wilderness legislation apply to the bottom lands of Drakes Estero? -is it possible that the NPS was meant to preserve the commercial shellfish operations as a historic resource within the wilderness? -is it possible that the NPS was meant to preserve a public trust resource within the wilderness?
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NPS Response to Concern Statement 36968:

As part of the Point Reyes Wilderness Act of 1976 (PL 94-544) and two days later as part of PL 94-567, Drakes Estero was designated by Congress as potential Wilderness. Further extended discussion of the history of this act is beyond the scope of this EIS. As noted in the 2004 opinion of the Field Solicitor, NPS is mandated by the Wilderness Act and Point Reyes Wilderness Act to convert potential wilderness to wilderness status as soon as the nonconforming use can be eliminated. And as discussed in the response to Concern Statement 36942 and elsewhere in the EIS, neither the RUO nor any authority other than section 124 allows DBOC's nonconforming use to continue beyond November 30, 2012.

As for the comment as to whether the oyster farm is a historic resource, a Determination of National Register Eligibility (DOE) was prepared for DBOC onshore and offshore facilities (Caywood and Hagen 2011). It found that while the oyster-growing operation in Drakes Estero is significantly associated with

the rebirth and development of the California oyster industry, which began in the 1930s, the property is ineligible for listing in the National Register because it lacks historic integrity. The State Historic Preservation Officer (SHPO) has concurred with this determination. As described in the EIS, this property and operation are not eligible and thereby do not represent historic structures, resources, or landscape as defined under the National Historic Preservation Act.

For additional information regarding management authority over Drakes Estero, please see concern statement 36946. For additional information regarding state management of fishing through the Marine Life Protection Act in Drakes Estero please see concern statement 36371.

PN5900 - Commercial Shellfish Operations in Drakes Estero

Concern Statement 35923	Commenters requested a number of editorial revisions to this section summarizing commercial shellfish operations in Drakes Estero, including items such as descriptions of the CDFG lease, additional history on Johnson Oyster Company, and corrections of regulatory authority.
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NPS Response to Concern Statement 35923:

These editorial suggestions to revise the text were reviewed, considered, and incorporated into the “Commercial Shellfish Operations in Drakes Estero” section of the Final EIS on pages 18-24, as appropriate.

Concern Statement 36998	Commenters requested additional detail on the violations that have taken place in Drakes Estero, such as misplacement of Manila clams.
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NPS Response to Concern Statement 36998:

Specific violations regarding Manila clam placement were addressed in the EIS. Additional information regarding violations cited by the California Coastal Commission (CCC) in letter(s) of February 1, 2012, July 30, 2012, and October 24, 2012 are included in the chapter 1 sections “Drakes Bay Oyster Company: 2005 to Present” (pages 21-24) and in the “California Coastal Act” discussion on pages 59-62. Editorial changes as requested by CCC have been addressed in the “Commercial Shellfish Operations in Drakes Estero” section of the Final EIS on pages 18-24.

PN6000 - NEPA Process

Concern Statement 35933	<p>Commenters questioned why an EIS is required prior to making a decision with regard to the potential issuance of a new SUP to DBOC, especially considering the following issues:</p> <ul style="list-style-type: none"> -preparation of an EIS is inconsistent with previous park practices -preparation of an EIS is inconsistent with the “notwithstanding” clause included in section 124 -the issue has been the subject of various other environmental reports
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NPS Response to Concern Statement 35933:

Although the Secretary’s authority under section 124 is “notwithstanding any other provision of law,” the Department has determined that it is helpful to generally follow the procedures of NEPA. The EIS provides decision-makers with sufficient information on potential environmental impacts, within the context of law and policy, to make an informed decision on whether or not to issue a new SUP. In addition, the EIS process provides the public with an opportunity to provide input to the decision-makers on the topics covered by this document.

Concern Statement 35934	Commenters suggested that the EIS be placed on hold until the House Committee on Oversight and Government Reform has completed their review.
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NPS Response to Concern Statement 35934:

Although the Secretary's authority under section 124 is "notwithstanding any other provision of law," DOI has determined that it is helpful to generally follow the procedures of NEPA. The EIS provides decision-makers with sufficient information on potential environmental impacts, within the context of law and policy, to make an informed decision on whether or not to issue a new SUP. The timeline for the NEPA process was maintained in order to provide the Secretary with relevant information prior to the SUP expiration on November 30, 2012. The authority granted to the Secretary of the Interior to issue a new SUP under section 124 also expires on November 30, 2012.

PN7050 - Impact Topic Dismissed: Vegetation

Concern Statement 35982	Commenters requested additional detail regarding impacts on vegetation.
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NPS Response to Concern Statement 35982:

Potential impacts of the proposed action on vegetation (primarily the coastal scrub community) would be negligible. The coastal scrub community is common in and around the DBOC facilities and along the access road; however, no changes are anticipated that would extend beyond the developed footprint as a result of implementing the no-action or action alternatives. Potential impacts from trampling would be negligible. The rare plants known to exist in the vicinity of project area were identified using inventory data provided by NPS (listed in appendix E). These plants would not be impacted by the proposed action; either because they the project area does not provide suitable habitat or because they are located outside areas of direct and indirect impacts, including within some of the adjacent coastal scrub areas and vegetated intertidal areas (NPS 2010f). Therefore, a detailed analysis of rare plants was not included in the EIS.

PN7100 - Impact Topic Dismissed: Carbon Footprint

Concern Statement 35983	Commenters requested additional detail regarding the carbon footprint associated with importing the equivalent of DBOC's shellfish production should a new SUP not be issued.
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NPS Response to Concern Statement 35983:

The mission of the NPS, as defined by the NPS Organic Act (16 USC 1), does not include food security or providing opportunities for local food sources. While some commenters assert that as a result, oysters would need to be flown in from international areas, no concrete data has been provided to the NPS to support this assertion. Oyster production in California, as a whole, appears to be increasing at a rate greater than DBOC's production. For example, as described in chapter 3 of the EIS, in 2010, DBOC produced 585,277 pounds of shucked oyster meat (6.89 million oysters), a 28 percent increase over 2009 production levels. During this same period, the California oyster market increased 43 percent. An increase in Pacific oyster production in Humboldt Bay was the primary contributor to this change (the California Pacific oyster market increased 48 percent, by weight, between 2009 and 2010) (CDFG 2011e). Based on this information, it is likely that at least some portion of the current DBOC production could be accommodated by other operations in the state of California.

Furthermore, it is possible that demand may shift to another product or that the market demand would lead to new production in other California locations. Because there is no certainty regarding how the market and demand would respond, there is no way to calculate quantifiable, reasonably foreseeable impacts from global carbon emissions that can be meaningfully analyzed.

PN7150 - Impact Topic Dismissed: Geologic Resources

Concern Statement 37005	A commenter requested that geologic resources be addressed in more detail due to the potential for sediment disturbance.
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NPS Response to Concern Statement 37005:

Sediment disturbance is discussed in the appropriate impact topics that are affected by sediment dynamics. See “Impacts on Water Quality (pages 423-441), Impacts on Eelgrass (pages 326-340), and “Impacts on Wildlife and Wildlife Habitat: Benthic Fauna” (pages 341-356). Text has been added to these discussions where appropriate.

PN7200 - Impact Topic Dismissed: Cultural Resources

Concern Statement 35984	<p>Commenters requested additional discussion on the following items related to cultural resources:</p> <ul style="list-style-type: none"> -archeological evidence of prehistoric shellfish cultivation -historic significance of viewshed experience by Sir Francis Drake -role of ranches and shellfish operation in historic local landscape -significance of the last on-site oyster cannery in California -cultural experience for visitors -SHPO concurrence with the DOE
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NPS Response to Concern Statement 35984:

Text has been added to the “Cultural Resources” section on pages 44-48 of the Final EIS, where appropriate.

For the specific items identified above, the following changes have been made:

Archeological evidence of prehistoric shellfish cultivation. Note that studies by Konzak and Praetzellis (2011) and Babalis (2011) indicate that Olympia oyster has historically had a very limited distribution in Drakes Estero. The Konzak and Praetzellis (2011) study, titled *Archaeology of Ostrea lurida in Drakes Estero, Point Reyes National Seashore*, discusses in detail the archeological evidence of historic shellfish populations in Drakes Estero. The primary conclusions of this study are summarized in the following excerpt from that report: “...there is no archaeological evidence that a sizeable population of [Olympia oyster] inhabited Drakes Estero and was utilized as a primary dietary resource by the Coast Miwok.” Further, “While small populations of the Olympia oyster may have existed in the Estero and been utilized by the Coast Miwok, the relative abundance of oyster remains in Tomles Bay and their absence at all but two archaeological sites in Drakes Estero make it more likely that the oysters were brought in from Tomales Bay.” This report has been available for public access on the NPS Point Reyes website.

Historic significance of viewshed experience by Sir Francis Drake. The historic significance of the viewshed experienced by Sir Francis Drake is speculative and cannot be analyzed further.

Role of ranches and shellfish operation in historic local landscape. The oyster-growing facilities lie within but do not contribute to the significance of the Point Reyes Ranches Historic District, which was determined eligible for the National Register (Historical Research Associates, Inc. 2008).

Significance of the last onsite oyster cannery in California. The EIS acknowledges that DBOC operates the last oyster cannery in California. Canning operations at DBOC occur within an onsite shipping container. This container does not have cultural significance and none of the structures at DBOC are potentially eligible for listing on the National Register of Historic Places.

Cultural experience for visitors. Use of the DBOC onshore area over time by DBOC customers and park visitors is not considered a historic or cultural resource as defined by the National Historic Preservation Act or NPS Management Policies 2006. Use of the site is addressed in the section on visitor experience and recreation in chapters 3 and 4.

SHPO concurrence with the DOE. Under the “Cultural Resources” dismissal section, a summary of the DOE preparation and review by SHPO has been provided. The SHPO concurred on August 4, 2011 with the NPS determination that the DBOC property is ineligible for listing on the National Register (see appendix D of Final EIS for a copy of the letter).

Concern Statement 36992	A commenter requested that cultural resources be addressed in chapter 3 of the EIS.
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NPS Response to Concern Statement 36992:

A description of the history of commercial shellfish operations in Drakes Estero is provided in chapter 1 on pages 18-24 of the Final EIS. Because the impact topic of cultural resources is considered but dismissed from further analysis, a brief summary of cultural resources (including archeological resources, cultural landscapes, historic structures, and ethnographic resources and sacred sites) in the Drakes Estero area is provided on pages 44-48 of the Final EIS.

Concern Statement 37777	A commenter stated that DBOC should be included in the pastoral/agricultural zone of the park, as oyster farming is an important part of the agricultural heritage of the Drakes Bay era. The commenter also stated that historic integrity should not be based on architectural integrity, specifically for an agricultural operation.
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NPS Response to Concern Statement 37777:

Please refer to pages 14-16 of the Final EIS for the NPS interpretation of the pastoral/agricultural zone and its relation to DBOC. Refer to pages 44-48 for an explanation of historic integrity and how cultural resources are defined.

PN7300 - Impact Topic Dismissed: Environmental Justice

Concern Statement 35957	Commenters requested additional detail regarding impacts related to environmental justice including: -disproportionate impacts on women and ethnic minorities -loss of housing and jobs
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NPS Response to Concern Statement 35957:

As explained on page 48 of the Final EIS, Executive Order 12898 is required to consider potential environmental justice impacts. Pursuant to the executive order, environmental justice impacts are those that would result in disproportionately high and adverse human health or environmental effects on minority or low-income populations. NPS evaluated whether the project could result in disproportionate impacts on environmental justice populations.

To achieve this, NPS followed the thresholds identified in the Metropolitan Transportation Commission's (MTC) Transportation Improvement Program for the San Francisco Bay Area, as well as Executive Order 12898. MTC defined a low-income population as a community with a low-income population that is at least 30 percent of its total population. MTC defined a minority population as a community with a minority population of at least 70 percent. The use of these thresholds is consistent with the stipulations of Executive Order 12898.

However, multiple commenters suggested the dismissal of environmental justice was in error particularly that NPS failed to adequately consider impacts to minorities. NPS reexamined its thresholds and looked to the Council on Environmental Quality's (CEQ) "Environmental Justice: Guidance Under the National Environmental Policy Act." (Available at <http://ceq.hss.doe.gov/nepa/regs/ej/ej.pdf>). The CEQ document is a guidance document, not an executive order. The CEQ guidance provides a more expansive threshold for determination of minority populations than that identified by MTC; a census block with a population comprised of at least 50 percent minorities. The MTC's threshold of 70 percent is based on the average minority population in the San Francisco Bay Area. Marin County is demographically different from the rest of the San Francisco Bay Area with a much higher white and higher income population. A lower threshold may be more appropriate to identify any minority populations within Inverness Census Designated Place (CDP) and Marin County. Therefore, for the Final EIS, NPS adopted the 50 percent threshold from the Executive Order.

In addition, NPS re-examined the scale at which environmental justice issues were analyzed. In the Final EIS, the affected area is defined as the Inverness CDP, as this is consistent with the scale used to describe the socioeconomic impacts of the project on a local level. Marin County is used for comparative purposes, as it the next-largest scale used to describe socioeconomic impacts. Evaluating minority populations at a scale smaller than the Inverness CDP (i.e., DBOC employees only) would inflate the intensity of impacts. See pages 48-52 of the Final EIS for additional information.

The NPS acknowledges that many of the DBOC employees are of Hispanic origin. However, as described on pages 48-49 of the EIS, the concept of race is different than the concept of Hispanic origin. As such, it is not appropriate to add the Hispanic and minority percentages together to achieve an overall minority percentage. This would result in double counting and an inflation of the actual minority population in Inverness CDP and Marin County.

Data is not available regarding the race or financial status of visitors to DBOC. Therefore, NPS cannot evaluate whether the proposed alternatives would impact visitation to DBOC by environmental justice populations.

In summary, due to the lack of low-income and/or minority populations in the vicinity of Point Reyes National Seashore, even with the more expansive threshold in the Executive Order, dismissal of the topic from detailed analysis was appropriate.

Concern Statement 38632	A commenter requested additional discussion of NPS policies and responsibilities in regards to environmental justice, in particular as they relate to public health, and stated that environmental justice be retained as an impact topic.
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NPS Response Concern Statement 38632:

As described in chapter 1 of the Final EIS, Executive Order 12898: *General Actions to Address Environmental Justice in minority Populations and Low-Income Populations*, requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental impacts of their programs and policies on minorities and low-income populations and communities (EPA 1994). To achieve this, NPS adheres to the six principles for consideration of environmental justice described in the Executive Order (as detailed on page 48 of chapter 1 of the EIS. Based on the analysis conducted for this EIS, the public health impacts from this project are remote and negligible. For example, NPS considered

air quality as an impact topic in the EIS but dismissed it from further consideration when it determined that emissions from the alternatives would be below the “de minimis” thresholds for San Francisco Bay Area nonattainment areas (pages 41-42 of the EIS). Potential public health issues such as the water quality of Drakes Estero, including food poisoning from oyster produced at DBOC are discussed in the “Impacts on Water Quality” section of the EIS on pages xx. For these reasons, and the others identified on pages 48-52 of chapter 1, environmental justice was considered but dismissed from further analysis in the EIS.

PN7400 – Impact Topics Dismissed: Local Food

Concern Statement 36056	Commenters felt the impacts to local food if DBOC ceases to operate should be considered in the EIS.
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NPS Response Concern Statement 36056:

The impact topic of local food has been added to the “Issues and Impact Topics Considered but Dismissed from Further Analysis” section of chapter 1, on pages 43-44 of the Final EIS, and is discussed there. Socioeconomic impacts associated with the loss of DBOC are described in the “Impacts on Socioeconomic Resources” section of chapter 4.

AL4000 - Alternatives: Existing Conditions

Concern Statement 35986	<p>Commenters requested that the EIS include additional detail and/or corrections regarding the existing conditions, including:</p> <ul style="list-style-type: none"> -temporary structures -discharge of water -live shellfish holding tanks -picnic tables -shell piles -ownership of buildings -marine biotoxin sampling -management of invasive species -debris cleanup
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NPS Response to Concern Statement 35986:

Where appropriate, detail has been added and/or corrections have been made to the “Existing Conditions” section in chapter 2 on pages 85-11 of the Final EIS. It should be noted that the issuance of the 2008 SUP did not result in retroactive approval of facilities and operations that had not been previously approved by the NPS. The 2008 SUP cover page indicates that NEPA compliance for the 2008 SUP was “pending.” Before the NPS could fully initiate the NEPA document contemplated by the parties in 2008, Congress enacted section 124. This EIS is now the vehicle in which NPS is considering different operating scenarios for DBOC, as described under each alternative.

Temporary structures. Language clarifying this situation has been added to page 103 of the Final EIS. Some of DBOC’s existing facilities have not been approved by the NPS or have only been granted temporary approval. Specifically, NPS provided authorization for temporary structures; however, it was assumed that these items would be temporary and would be removed as soon as they could be replaced by permanent structures.

Discharge of water. Discharge of water is subject to certification by the San Francisco Bay Regional Water Quality Control Board; however, recent communication between the NPS and the San Francisco

Bay Regional Water Quality Control Board has indicated that a National Pollutant Discharge Elimination System permit would not be required at this time. Therefore, this sentence has been removed from the Final EIS.

Live shellfish holding facility. Additional detail on this facility was added to pages 108-109 of the Final EIS, per information provided by DBOC on June 5, 2012.

Picnic tables. Information regarding picnic table numbers and location are clarified for consideration on each of the action alternatives in chapter 2 of the EIS.

Shell piles. A date has been added to the photograph of stockpiled shells included in the Final EIS. The shell pile locations are based on the recent survey of the area, and the SUP boundary is based on NPS GIS data. The EIS does not address formation of the 2008 SUP boundary.

Ownership of the buildings. The ownership of onshore facilities at DBOC is listed in table 2-3 on page 106.

Marine biotoxin and macroalgae sampling. The SUP would establish a specific section that documents and accommodates access to established water quality stations for the purpose of California Department of Public Health pathogen and paralytic shellfish poisoning monitoring activities.

Management of invasive species. Text has been revised to note that boats and gear used in DBOC operations are not moved outside of the Estero. All other items noted about DBOC's control of invasive species are included within the alternatives descriptions.

Debris cleanup. Debris cleanup is a requirement of sections 3.2.2 and 3.2.3 of the 2007 Cease and Desist Order with the California Coastal Commission and section 7(b) of the 2008 SUP. DBOC asserts that it makes a serious effort to maintain structures and retrieve any debris from its operation as well as debris that may be a result of shellfish operations under the previous owners and is in the process of revising their Debris Removal Plan, as required by section 3.2.3 of Consent Order No. CCC-07-CD-04. The items provided by DBOC regarding the procedures they use to minimize debris to the "Existing Conditions" section. In their October 24, 2012 Notice of Intent to proceed with a new Cease and Desist and Restoration Order, the CCC concludes that as a result of documented discharge of marine debris in the form of abandoned, discarded, or fugitive aquaculture materials, DBOC is in violation of section 3.2.2 of the 2007 Cease and Desist Order.

**Concern
Statement
36927**

Commenters requested that the EIS include additional detail and/or corrections regarding the approval of existing structures within the project area.

NPS Response to Concern Statement 36927:

The issuance of the 2008 SUP did not result in retroactive approval of facilities and operations that had not been previously approved by the NPS. The 2008 SUP cover page indicates that NEPA compliance for the 2008 SUP was "pending." This statement reflects the understanding between NPS and DBOC at the time that the NPS would prepare an NEPA analysis presenting alternative operating scenarios for DBOC's operation through November 30, 2012. In furtherance of this understanding, the NPS and DBOC entered into a "Statement of Principles" setting forth the manner in which the parties would work together during the NEPA process. The Statement of Principles provides that DBOC would prepare a "description of their operations for NEPA evaluation" and that NPS would consider this description in developing the purpose and need for the NEPA document and alternatives to be considered. The parties' agreement that a NEPA process would be conducted to analyze options for and determine the scope of DBOC's operation through November 30, 2012 confirms that NPS had not approved each and every facility or operating practice in existence at the time the 2008 SUP was executed. Before the NPS could fully initiate the NEPA document contemplated by the parties in 2008, Congress enacted section 124. This EIS is now the vehicle in which NPS is considering different operating scenarios for DBOC.

AL5000 - Alternative A

Concern Statement 35987	Commenters question the identification of alternative A as the no-action alternative either generally or because it does not reflect existing conditions carried forward.
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NPS Response to Concern Statement 35987:

As described on page 113 of the Final EIS, the CEQ's NEPA regulations require the alternatives chapter in an EIS to "include the alternative of no action" (40 CFR 1502.14). The Department of the Interior's NEPA regulations, 43 CFR 46.30, provide two interpretations for the term "no action." The first interpretation is that no action "may mean 'no change' from a current management direction or level of management intensity (e.g., if no ground-disturbance is currently underway, no action means no ground-disturbance)." The second interpretation "may mean 'no project' in cases where a new project is proposed for implementation." This EIS contains alternatives satisfying both of these interpretations. Alternative A is a "no project" alternative. Alternative B essentially represents continuation of the current level of management intensity.

The CEQ's Forty Most Asked Questions provide additional guidance to agencies in determining which no action formulation is most appropriate in a particular EIS. The CEQ explains that the proper type of no action alternative to be considered depends on the nature of the proposal being evaluated. The first situation typically involves an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. The second type of "no action," is illustrated by situations involving federal decisions on proposals for projects. For this type of "no action" alternative, the proposed activity would not take place and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

This second situation is more relevant to this EIS, which analyzes a federal decision on DBOC's proposal. DBOC has requested a new permit from NPS so that it may continue to operate after November 30, 2012. Absent federal action on DBOC's request for a new permit, the RUO and SUP would expire on November 30, 2012 and DBOC's operation would cease. This EIS therefore compares the effects of taking no action (i.e., no new permit for DBOC under section 124) to alternatives B, C, and D, which involve issuance of a new permit under section 124.

Multiple commenters also suggested that NPS is required to consider a "no change" alternative which would be the issuance of a new SUP with the same conditions and that this should be identified as the no-action alternative. Even though NPS has determined that alternative A is the more appropriate no-action alternative, this EIS also fully analyzes an alternative in which current conditions continue in to the future, within the constraints of section 124. That alternative is alternative B.

Concern Statement 35988	Commenters requested additional detail on the actions that would take place under alternative A, including the following: -removal of the buildings -restoration of the site -installation of a gate at Sir Francis Drake Boulevard
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NPS Response to Concern Statement 35988:

Removal of buildings. The narrative in the Final EIS has been refined to identify NPS-owned property (property that was present and acquired at the time of purchase) and DBOC-owned property (property that was placed on the property after the RUO was established). Figure 2-6 also shows which buildings would be removed. The RUO and SUP each contain specific language regarding the timing and removal

of personal property. The removal of personal property is addressed generally under the elements common to all alternatives and more specifically under each alternative.

With respect to the timeline for removal of property under alternative A, the removal of personal property within the 1.5 acre RUO area is defined under Paragraph 12 of the RUO. Paragraph 12 states the Vendor “shall remove all structures and improvements placed on the premises during the period of its reservation. Any such property not removed within 90 days after the expiration of the Vendor’s reservation shall be presumed to have been abandoned and shall ...become the property of the United States of America, but this shall in no way relieve the Vendor of liability for the cost of removal of such property from the reserved premises.” This 90 day window is only applicable within the 1.5 acre RUO and not to any other areas of the current SUP. Section 23(a) of the SUP states that at the conclusion of existing authorizations the “permittee shall surrender and vacate the premises,” remove personal property and return the premises to good order. Section 23(b) establishes that if after conclusion of the permitted uses the permittee shall fail to remove personal property, the permitter “may cause it to be removed and the Premises to be repaired at the expense of Permittee.” Section 23 of the SUP establishes that termination is on the date of termination and there is no holding over on the property. Similar clarification was added to page 114 of the Final EIS.

Under all action alternatives, any new construction proposed by DBOC would be considered personal property and subject to the removal terms and conditions as presented in the SUP.

Finally, consistent with the current SUP, which incorporates by reference the state shellfish lease, the racks are identified as part of the operation to be removed by the permittee upon termination of the lease. Further, the California Department of Fish and Game holds an escrow account for the purpose of covering the removal of materials and structures from the growing area.

Restoration of the site. As defined in section 23(a) of the SUP, the “Permittee shall also return the premises to as good order and condition (subject to wear and tear and damage that is not caused directly or indirectly by Permittee) as that existing upon [April 22, 2008]” (NPS 2008b). Restoration efforts by the NPS are beyond the stated purpose of the proposed project, which is to evaluate whether the Secretary should exercise the discretion granted under section 124 to issue a 10-year permit to DBOC. Plans for comprehensive site restoration would be developed in the future and subject to additional NEPA compliance.

Installation of a gate at Sir Francis Drake Boulevard. The Final EIS identifies installation of a gate at the entrance to the onshore facilities at Sir Francis Drake Blvd under the no action alternative. The intent of the gate is to prevent boat access to the Estero during the harbor seal pupping closure period (March 1 – June 30). Pedestrian access to Drakes Estero would continue unimpeded. Other park roads have gates on them in order to allow the park to close the road for various circumstances. This gate would not prevent public access to the Estero or the shoreline; rather it is intended to deter nonmotorized boat access in to the Estero during this period. Signage associated with the gate would inform the public as to the reasons for the closure. The gate would be standard and the installation procedures would include digging of holes for the posts, anchorage of those posts, and hanging of the gate on the posts. The gate would be tied in to a split rail fence, similar to that at the overlook just to the west along Sir Francis Drake Boulevard.

AL6000 - Alternatives: Elements Common to All Action Alternatives

Concern Statement 35990	<p>Commenters suggested that additional items be considered under the action alternatives, including the following:</p> <ul style="list-style-type: none"> -eliminate nonnative species cultivation -require DBOC to reimburse NPS for cost of EIS preparation -limit harvest to occur less frequently than once a year -replace the DBOC sign at Sir Francis Drake Blvd -eliminate production limits -allow picnic tables under all action alternatives -install a gate at Sir Francis Drake Boulevard -increase of harbor seal protection distance
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NPS Response Concern Statement 35990:

Nonnative Species Cultivation. Section 124 of PL 111-88 provides to the Secretary of the Interior (Secretary) the discretionary authority to issue a new SUP to DBOC for a period of 10 years with the same terms and conditions as DBOC's existing authorizations (i.e., the SUP and the RUO). The alternatives presented in the EIS would allow DBOC to cultivate the same types of nonnative species that it is allowed to cultivate under the existing authorizations. These species are the Pacific oyster (*Crassostrea gigas*) and Manila clam (*Tapes philippinarium*). The extent of Manila clam distribution varies among alternatives B and D, and production limits also vary. The production of Manila clams would not be authorized under alternative C. While Manila clams were permitted in Area 2 in 2008, the bottom bag culture method used at the time was not consistent with authorized methods for that permit. Additionally, in the 2012 NAS review of the Draft EIS, the NAS committee suggested removal of Manila clams as an approach to reduce risk of establishment by this known invasive species along the Pacific coast. The elimination of nonnative species cultivation also is included in the no-action alternative. As described under the "Elements Common to All Action Alternatives" section, DBOC has withdrawn their request to cultivate European flat oyster (*Ostrea edulis*); therefore, it is no longer considered in the Final EIS.

Payment for the EIS. At the time the 2008 SUP was signed, the NPS and DBOC entered into a statement of principles (appendix C) which states that DBOC will not be responsible for covering the costs of a NEPA document. The Statement of Principles contemplated that the NPS would prepare a NEPA document to assess alternative scenarios for DBOC's operation between 2008 and November 30, 2012. Before the NPS could prepare a NEPA document addressing DBOC's operations during that time period, Congress enacted section 124. The NPS has stated that it would follow the Statement of Principles to the extent applicable to this EIS process. The NPS agreed to assume the cost of preparing this EIS.

Production Levels. The action alternatives presented in the Final EIS describe different levels of production, consistent with section 4(b)(i) of the SUP which states that "Production of all shellfish species shall be capped at the 'current production level' as determined under the California Coastal Commission Consent Order CCC-07-CD-04." The CCC's Consent Order defines "current production level" as "the amount harvested *in the last year* and any projected increases in yield *for the coming year*." (CCC-07-CD-04, section 3.2.10, emphasis added.) Because the Consent Order was issued in 2007, the relevant time period reflected in the CCC definition is 2007 and 2008. The CCC has not yet provided an exact number for "current production level." The production level in alternative C represents conditions present in 2008 when the SUP was signed; the production level in alternative B represents 2010 conditions when this EIS process began; and alternative D represents the level of production that DBOC submitted to the CCC for approval and which the CCC later rejected. The conversion rate used during establishment of these production levels is 100 oysters per gallon and 8.5 pounds per gallon and is defined as the average annual production over a rolling three year period, which would include the current year and the two previous years.

Commenters suggested that the production limits of any amount are not appropriate because variable growing conditions in a given year could lead to higher levels of survival, etc. This concern has been addressed in the Final EIS. The production level under alternatives B, C, and D is defined as the average annual production over a rolling three year period, which would include the current year and the two previous years, rather than as a fixed, yearly ceiling. This modification would allow DBOC to adapt its planting and harvest levels in response to more or less productive years. The retention of production levels is technically and economically feasible. It is also consistent with section 124 which requires that any new permit contain the same terms and conditions as the existing authorizations.

Harvest Frequency. The EIS presents what is known about the operational aspects of DBOC in chapter 2 (pages 92-111). Cultivation of shellfish is an ongoing operation with shellfish harvested year-round. All aspects of the operation are occurring on a weekly to monthly basis. Limitation of harvest to less than once per year is not considered feasible to the operation.

DBOC Sign. Commenters addressed replacement of the DBOC sign at Sir Francis Drake Blvd. The road from Sir Francis Drake Blvd to the DBOC structures is a park road and not part of the RUO or SUP. The NPS has been in communication with DBOC regarding DBOC requests for signage on Sir Francis Drake Boulevard. The NPS has reiterated that the location is not part of the permit or RUO area, and content of signs must be compliant with NPS Management Policies and the Department of Transportation “Manual on Uniform Traffic Control Devices.” NPS *Management Policies 2006* sections 9.2.5 – Traffic Signs and Markings, 9.3.1.1 Signs, and 9.3.5 – Advertising, are applicable to any requests related to the signs. These policies establish strict guidelines regarding the size and content of signs throughout the Seashore, including the requirement that signs do not provide advertising.

Picnic Tables. The action alternatives presented in the Draft EIS considered picnic tables under alternatives B and D, but not under alternative C. Subsequent to the public comment period, the DBOC submitted an application for Coastal Development Permit to the CCC that requests a total of 18 picnic tables – increased from 12 currently onsite (DBOC 2012a). In addition, in that letter, DBOC requested permission to install 12 free-standing barbecues in the picnic area and one hot ash collection basin. This request was also included to the CCC as part of the CDP permit application on the same day. The NPS will consider 12 picnic tables under alternative B (representing the conditions present in 2010 when the EIS process was initiated), 12 picnic tables limited to the picnic area adjacent to the office/warehouse under alternative C, and 18 picnic tables under alternative D. The NPS evaluated the request for barbecues as part of alternative D.

As part of their February 17, 2012 (DBOC 2012a) request to the CCC and their June 5, 2012 letter to the NPS, DBOC also included additional details on the installation of the 1,050 foot intake pipe which is considered under alternative D in the EIS. These additional details are included in the description of the alternative D in the Final EIS.

Distance from Harbor Seals. Commenters requested that the NPS increase the harbor seal protection distance described in the Draft EIS. As stated in the Final EIS, the NPS considered larger protection distances, as described in the 2009 NAS report, however, given the issues associated with the ability of operators to recognize and avoid seals at greater distances, and the enforceability of this measure, the current protection zones and seasonal lateral channel closure were maintained. The 100 meter buffer was also maintained. This restriction prohibits vessels and people from approaching within 100 meters of any hauled-out seal that it outside one of the designated harbor seal protection areas.

Gate. The EIS identifies installation of a gate at the entrance to the onshore facilities at Sir Francis Drake Blvd under the no-action alternative, as described under concern ID 35988 above. A gate is not proposed under alternatives B, C, or D because DBOC and visitors to the oyster operation need year round vehicular access to the onshore areas near DBOC’s facilities.

Concern Statement 36700	<p>Commenters requested clarification or additional detail on topics regarding the action alternatives, including:</p> <ul style="list-style-type: none"> -exemption of DBOC boat traffic from seasonal boat closures -boat traffic and vessel transit plan -revised water quality sampling -rack repair -shellfish cultivation area -dredging
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NPS Response to Concern Statement 36700:

Boat Traffic During Popping Season. DBOC must use boats year round as part of their commercial operation. Exhibit A of the 2008 SUP – Harbor Seal Protection Protocol – establishes permanent and seasonal closure areas intended to reduce the possibility for disturbance of harbor seals.

Boat Traffic and Vessel Transit Plan. The Final EIS discusses all information that DBOC provided in a November 15, 2010 letter titled "1 - Vessel Transit Plan" which included a map of primary routes, two days worth of GPS information (used to develop the boat operations cover (depicted on figure 2-2) and a short description of DBOC practices. The NPS requested additional information regarding boat GPS information but DBOC did not provide additional data. As described in the EIS, the action alternatives include a permit area which would incorporate all shellfish growing operations, including boat operations. All routes and boat traffic would be required to remain within the SUP area. Exceptions for access to established water quality and Paralytic Shellfish Poisoning (PSP) stations required by the California Department of Health Services will be identified as part of any SUP.

Revised Water Quality Sampling. As described on page 116 of the Final EIS, NPS and CDPH have reviewed sampling protocols, intent, and requirements. According to CDPH, no active water quality stations are maintained outside of the existing permit area. Secondary stations are sampled less frequently. It is the responsibility of DBOC as the operator to sample the primary stations, while CDPH maintains the secondary stations (with access provided by DBOC boats). NPS will continue to coordinate with CDPH regarding access to stations 17, 18, and 19, during the established seasonal closure (March 1 - June 30). DBOC and CDPH shall notify the NPS of sampling events 24 hours prior to the event. CDPH shall review results with the NPS annually and any changes to the monitoring program should be proposed to the NPS for review consistent with the SUP. Exceptions for access to established water quality and Paralytic Shellfish Poisoning (PSP) stations required by the California Department of Health Services will be identified as part of any SUP.

Rack Repair. In their June 5, 2012 letter, DBOC proposed to repair/replace 50 racks in 2013 and another 25 racks in 2014. It is assumed that the racks would be required to be treated with an inert substance prior to installation and that installation would take place using standard best management practices. Based on the information available to NPS, revisions were made to the description of the action alternatives on page 123 of the Final EIS and to the chapter 4 analysis in the Final EIS.

Shellfish Cultivation Area. Consistent with the provisions of the existing SUP, DBOC could apply to NPS for a change in shellfish cultivation area under all alternatives. The text in the "Elements Common to All Action Alternatives" has been revised to clarify.

Dredging. Dredging of the area around the dock would be necessary to provide water depths sufficient to operate boats at low tide. While the dredging method is unknown, it should be noted that the same method would apply to alternatives B, C, and D. It is assumed that best management practices such as the use of a floating silt curtain would be required. Again, permit authorization would be required for the dredging operation, and details would be provided to the regulatory agencies by DBOC explaining the exact location of the dredged area, the amount of dredged material removed, and best management practices implemented to protect water quality. This information can be found on page 125 of the Final EIS.

Concern Statement 37403	A commenter requested clarification on what specific sections of the CDFG lease would be incorporated in the new SUP.
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NPS Response to Concern Statement 37403:

Relevant provisions of the existing CDFG permit would be incorporated into the SUP including repair and cleanup requirements, payment requirements, the maintenance of an escrow account as “a financial guarantee of growing structure removal and/or cleanup expense in the event the lease is abandoned or otherwise terminated”, and rights of inspection (including premises, equipment and books pertaining to the cultivation on the leased premises).

Concern Statement 38085	Commenters suggested adaptive management strategies be considered under the action alternatives.
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NPS Response to Concern Statement 38085:

Adaptive management is used to improve managers’ understanding of ecological systems to better achieve management objectives and suggest changes in action to improve progress towards desired outcomes. It is a continuing iterative process where a problem is first assessed, potential management actions are designed and implemented, and those actions and resource responses are monitored over time. That data is then evaluated and actions are adjusted if necessary to better achieve desired management outcomes (Williams, Szaro, and Shapiro 2009).

Here, these sorts of adjustments would not meet the intended purpose of the action alternatives. Adjusting the operation of the oyster farm based on the results of monitoring would likely eliminate the certainty needed by DBOC to manage its business. Therefore, this EIS does not describe an adaptive approach to managing Drakes Estero should a new 10-year SUP be issued to DBOC. However, additional baseline surveys and monitoring are proposed to further increase understanding of the natural ecological processes within Drakes Estero, as described under “Elements Common to All Action Alternatives.”

AL6100 - Alternative B

Concern Statement 35993	A commenter requested additional information about DBOC’s proposed cultivation method, location, production numbers, and harvest/planting/maintenance activities of purple-hinged rock scallops.
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NPS Response to Concern Statement 35993:

Since the release of the Draft EIS, DBOC noted that it plans to use floating racks (where available), floating trays, and lantern nets to raise purple-hinged rock scallops. None of this infrastructure is present in Area 2 where purple-hinged rock scallops are currently permitted. This information has been added to the Final EIS; therefore, the EIS discusses all information available to the NPS on DBOC’s proposed cultivation method, location, production numbers, and harvest/planting/maintenance activities of purple-hinged rock scallops. The most detailed description of this is provided under alternative D. Under alternative D, purple-hinged rock scallops would be permitted for cultivation in Area 1 of the permit area (pages 138-143).

Concern Statement 38167	A commenter requested that the replacement of the conveyor system included in alternative D also be included in alternative B.
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NPS Response to Concern Statement 38167:

The replacement of the conveyor system as presented under the emergency request in March 2011 was included in alternatives B, C, and D of the Draft EIS, and is included in the Final EIS. See “Elements Common to All Action Alternatives” on page 125 of chapter 2.

AL6300 - Alternative D

Concern Statement 35997	<p>Commenters suggested new elements of alternative D or requested additional detail on the actions that would take place under alternative D, including the following:</p> <ul style="list-style-type: none"> -process by which additional review and authorization by NPS would take place -estimate of increase in boat trips
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NPS Response to Concern Statement 35997:

As described in the EIS, the two development proposals submitted by DBOC are evaluated at the conceptual level in this EIS. Additional planning, design, environmental compliance (including NEPA), and approval would be required prior to proceeding with construction of proposed new facilities. NPS would evaluate future requests from DBOC for consistency with the intent of this alternative, which is to allow for expanded operations within the scope of the conceptual proposal; approval/compliance for future development would be through a tiered planning process.

The estimate provided in the Final EIS is based on the information provided by DBOC during the February 16, 2011 site visit and in a letter to the NPS on June 5, 2012. In their December 9, 2011 comment letter on the Draft EIS, DBOC stated “it is very clear that limiting DBOC to two boats and barges with a combined use of 8 hours a day would cripple DBOC’s operations by limiting boat use to a fraction of the current use.” In the June 5, 2012 letter, DBOC noted that there are a number of variable demands which affect how much they must be on the water, including tides, weather, day length, planting season, high demand occasions, etc. DBOC did provide that the current level of operation is now three boats, not two as reported to VHB and presented in the Draft EIS. The description of DBOC boat use has been revised accordingly. Specific to alternative D, DBOC notes in their June 5, 2012 letter that “higher production levels may not require more boat trips.” This is noted in the Final EIS; however, because no assurance can be made that boat trips would not increase, the assumption remains such an increase is a possibility. This possibility remains qualitative based on available information.

AL7100 - Alternatives: Dismissed - Open Shellfish Operations to Competitive Bid

Concern Statement 35999	The EIS should consider opening shellfish operations to competitive bid.
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NPS Response to Concern Statement 35999:

Opening shellfish operations to competitive bid would not be consistent with section 124. See pages 146-147 of the Final EIS for the full justification on why opening shellfish operations to competitive bid was considered but dismissed from in-depth analysis.

AL7200 - Alternatives: Dismissed - Relocate DBOC

Concern Statement 36000	The EIS should consider relocating DBOC outside the Seashore or elsewhere within the Seashore.
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NPS Response to Concern Statement 36000:

Relocation of DBOC is not consistent with section 124. See page 147 of the Final EIS for the full justification on why relocating DBOC outside the Seashore or elsewhere within the Seashore was considered but dismissed from in-depth analysis.

AL7300 - Alternatives: Dismissed - Alter SUP Term

Concern Statement 36001	The EIS should consider issuing a new SUP for a period of more or less than 10 years.
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NPS Response to Concern Statement 36001:

Altering the SUP term is not consistent with section 124. See pages 147-148 of the Final EIS for the full justification on why issuing a new SUP for a period of more or less than 10 years was considered but dismissed from in-depth analysis.

AL7400 - Alternatives: Dismissed - Issue a Renewable SUP

Concern Statement 36002	The EIS should consider issuing a renewable SUP.
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NPS Response to Concern Statement 36002:

These comments express the view that a provision in the existing SUP/RUO allows the NPS to issue a “renewable” SUP to DBOC. The provision most often cited by commenters as allowing for a renewable SUP is Paragraph 11 of the RUO. The response to Concern Statement 36942 explains why Paragraph 11 of the RUO does not provide a basis for issuing a renewable SUP to DBOC. In addition, the NPS cannot issue a “renewable” SUP under section 124. Section 124 expressly limits the Secretary’s discretion to issuing a single permit of one 10-year term.

AL7600 - Alternatives: Dismissed - Incorporate Phase Out Requirements in New SUP

Concern Statement 36003	Commenters requested that incorporating phase out requirements in the new SUP be considered, if issued.
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NPS Response to Concern Statement 36003:

Incorporation of phase out requirements is not consistent with section 124. See pages 148-149 of the Final EIS for the full justification on why incorporating phase out requirements in the new SUP was considered but dismissed from in-depth analysis.

AL7700 - Alternatives: Dismissed - Comprehensive Restoration of the Developed Onshore Area

Concern Statement 36004	The EIS should consider developing a comprehensive restoration plan for both the onshore and offshore portions of the project area.
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NPS Response to Concern Statement 36004:

Separate actions related to comprehensive restoration of the developed onshore area are beyond the scope of this EIS, which analyzes the decision to be made under section 124. See page 149 of the Final EIS for the full justification on why comprehensive restoration of the developed onshore area was considered but dismissed from in-depth analysis.

AL8000 - Alternatives: New Elements or Alternatives

Concern Statement 36005	<p>Commenters suggested new alternative elements, including the following:</p> <ul style="list-style-type: none"> -designate a different oversight agency -modify the wilderness boundary -remove all restrictions on DBOC operations -public clean up of debris -designate a no wake zone -ensure that there is a bond to pay for environmental damage -require non-motorized harvest of oysters -make commercial use subject to the payment of royalties -remove asphalt -remove second leach field -addition of a visitor center at DBOC and remodeling of existing buildings
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NPS Response to Concern Statement 36005:

New alternative elements proposed during the public review were addressed as follows:

Designate a different oversight agency. Congress established Point Reyes National Seashore as a unit of the National Park System. The park’s enabling legislation directs that the lands and waters within the park shall be administered by the National Park Service according to the enabling legislation and the National Park Service Organic Act. The NPS does not have authority to delegate the management of park lands and resources to other agencies.

Modify the wilderness boundary. The boundary of the potential wilderness area encompassing Drakes Estero was based on a 1976 map prepared by the National Park Service and submitted to Congress during Congressional deliberations on the Point Reyes wilderness bill. In PL 94-544 and 94-567, Congress expressly adopted the boundaries depicted on the 1976 map as the official wilderness boundaries. Congress allowed for technical or typographical corrections to the map to be made administratively. However, any material modifications to the boundaries, such as removal of the Estero from potential wilderness, would have to be made through new legislation. The NPS therefore did not

consider moving the potential wilderness boundary in the action alternatives. NPS managers are obligated, through the *NPS Management Policies 2006* to manage potential wilderness as wilderness, with the exception of the nonconforming uses.

If the Secretary allows DBOC to operate for an additional ten years, section 124 directs that DBOC operate pursuant to a SUP having the same terms and conditions as DBOC's existing authorizations.

In addition, the terms and conditions in DBOC's existing authorizations were established, in part, to minimize the impacts of this commercial operation on the resources within Point Reyes National Seashore. These restrictions are based on relevant state and federal laws and on NPS policies. Removal of these restrictions would be inconsistent with the objectives of this EIS which include managing natural and cultural resources to support their protection and preservation, managing wilderness and potential wilderness to preserve wilderness character, and providing for visitor enjoyment of park resources.

Public clean up of debris. Debris cleanup is a requirement of DBOC pursuant to sections 3.2.2 and 3.2.3 of the 2007 Cease and Desist Order with the California Coastal Commission, and section 7(b) of the 2008 SUP, and is the responsibility of DBOC.

Designate a no wake zone. The current SUP under section 4(b)(vii) requires that "Boats shall be operated at low speed" to access the paralytic shellfish poison sentinel station. NPS can impose speed restrictions on the permittee without designating a no wake zone. The Final EIS identifies that for access to any CDPH monitoring stations outside of any permit area, the access to those areas be conducted at flat wake speed (36 CFR 1.4) and within one hour of the predicted high tide. The SUP would establish a specific section that documents and accommodates access to established water quality stations for the purpose of California Department of Public Health pathogen and paralytic shellfish poisoning monitoring activities. Flat wake speed means the minimum required speed to leave a flat wave disturbance close astern a moving vessel yet maintain steerageway, but in no case in excess of 5 statute miles per hour.

Ensure that there is a bond to pay for environmental damage. The SUP sets forth the requirements for DBOC with regard to its liability for environmental contamination and other types of damage to park lands and resources. Under the SUP, DBOC is required to carry certain types of insurance that would be used to compensate the NPS for damage or injury to park resources. These include Comprehensive General Liability insurance and automobile insurance. In addition, DBOC has indemnified the NPS for any damage that arises from its operations. The SUP also requires DBOC to remove its personal property from the park at the conclusion of the permit and undertake restoration of the area. Finally, DBOC is required to maintain an escrow account to fund removal of aquaculture infrastructure in the Estero. The NPS will work with CDFG to ensure that this account is accessible to the permitter and can be used upon termination of DBOC's SUP.

Require non-motorized harvest of oysters. This harvest method is not feasible. The beds and racks require transit a great distance from the on-shore facilities. Wind, waves, and tidal flow affect access conditions and would limit the ability of DBOC staff to access these areas in a safe and timely manner. Imposing this requirement on DBOC would place an unacceptable constraint on the ability of DBOC to feasibly conduct commercial shellfish operations.

Make commercial use subject to the payment of royalties. Royalties and permit fees are examples of mechanisms used to compensate a land owner for the use of land or the extraction of natural resources from the land of another. Section 124 requires "annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal." In enacting section 124, Congress chose "fair market value" as the mechanism to compensate the National Park Service for DBOC's use park lands and waters should the Secretary grant DBOC a new permit. Section 124 does not allow the NPS to collect royalties.

Remove asphalt/remove second leach field. As defined in section 23 of the SUP, the “Permittee shall also return the premises to as good order and condition (subject to wear and tear and damage that is not caused directly or indirectly by Permittee) as that existing upon [April 22, 2008]” (NPS 2008b). Restoration efforts by the NPS are beyond the stated purpose of the proposed project, which is to evaluate whether the Secretary should exercise the discretion granted under section 124 to issue a 10-year permit to DBOC. Plans for comprehensive site restoration would be developed in the future and subject to additional NEPA compliance. Under the No Action alternative, restoration would take place sooner than under the action alternatives.

New visitor center and remodeling of existing buildings. The NPS currently operates three visitor centers within the Seashore, including one at Drakes Beach. A visitor center at this site is not consistent with park planning efforts. Under the action alternatives, DBOC could remodel the existing buildings if requested to and approved by the NPS. Following expiration of the SUP (whether this takes place in 2012 or 2022), the potential for use and remodeling of the NPS-owned buildings at the site could be evaluated.

Concern Statement 39632	Commenters requested that the EIS provide additional detail on existing monitoring/management of invasive species, including evidence of effectiveness.
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NPS Response to Concern Statement 39632:

“Monitoring and managing invasive species” has been removed from the EIS as a cumulative action. Monitoring and baseline surveys related to Drakes Estero are now described in the “Elements Common to All Action Alternatives” section of chapter 2. Common to all alternatives, baseline surveys and monitoring of resources would occur to assist with identifying the extent and distribution of target resources including benthic and infaunal communities (tunicates, manila clams, etc.), and eelgrass. These surveys and results of monitoring would provide site-specific data and further increase understanding of the natural ecological processes within Drakes Estero, thus improving long-term management of the Estero.

See response to Concern ID 35975 for more information regarding special permit conditions that serve to reduce the intensity of potential impacts on particular resources.

AL8190 - New Alternative: Collaborative Management

Concern Statement 36007	Members of the public expressed support for the Collaborative Management alternative.
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NPS Response to Concern Statement 36007:

The collaborative management alternative includes the rehabilitation and new construction elements of alternative D, as proposed in the Final EIS, as well as the following items:

- option for a renewable permit/permit extension
- operation under a CDFG lease
- fair market value that takes into account the value of interpretive services provided by DBOC and the rehabilitation and new construction proposed
- a collaborative approach to develop interpretive programs and scientific research projects

The NPS did not include the “collaborative management” alternative as one of the alternatives in the EIS because its key elements lack legal foundation. As explained in the responses to Concern Statements 36002

and 34962, the NPS does not have the legal authority to issue a renewable SUP to DBOC. A renewable SUP is inconsistent with section 124 and is therefore inconsistent with the purpose and need of this EIS.

Response to concern ID 36946 addresses the issue of the leasing authority of the California Fish and Game Commission. CDFG would retain jurisdiction to regulate certain aspects of DBOC’s operation such as the importation of brood stock. The action alternatives include provisions for this type of CDFG oversight.

The Department of the Interior Office of Valuation Services contracted for an appraisal to determine the fair market value of the project area. The appraisal was conducted in accordance with federal appraisal standards and was used to establish the fair market value of the new permit.

Visitor services must be consistent, to the highest practicable degree, with the preservation and conservation of the resources and values of the Seashore (16 U.S.C. sections 5951(b), 5952; 36 CFR section 51.3) (definition of “visitor service”). The primary focus of DBOC is the commercial operation for sale of shellfish to restaurants and the wholesale shellfish market outside the Seashore. These are not commercial services being offered to the visiting public to further the public's use and enjoyment of the Seashore.

New construction would be the financial responsibility of DBOC.

All of the action alternatives presented in the EIS allow for a collaborative approach to develop interpretive programs and scientific research projects. None of the proposed elements would prohibit this approach from occurring if alternative B, C, or D is selected.

AL10000 - Alternatives: Preferred Alternative

Concern Statement 36642	Commenters requested that the NPS should clarify why no NPS preferred alternative was identified in the Draft EIS and what role the public comments will play in identification of the NPS preferred alternative.
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NPS Response to Concern Statement 36642:

The National Park Service did not identify a preferred alternative in the Draft EIS because the NPS wanted to encourage full and objective input from the public on all the alternatives presented in the Draft EIS (see page 154 of the Final EIS). NPS agrees with the commenter that public comments are not a vote. However, public comments can be very useful feedback to the agency regarding the scope of the plan, alternatives considered, and the adequacy of the impact analysis.

AL11000 - Alternatives: Environmentally Preferable Alternative

Concern Statement 36010	Commenters requested that the positive ecosystem services and provision of shellfish to local markets due to DBOC operations be taken into account when selecting the environmentally preferable alternative.
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NPS Response to Concern Statement 36010:

Pursuant to Department of the Interior NEPA regulations (43 CFR 46.30), the environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration of long-term environmental impacts and short-term impacts in evaluating what is the best protection of these resources.

The NPS acknowledges the potential beneficial impacts DBOC activities have by filtering water. This is noted in the Final EIS on pages 431, 436, and 438. These potential beneficial effects of the action alternatives do not outweigh the benefits associated with alternative A, which are summarized on page 153-154 and which led to its designation as the environmentally preferable alternative. The NPS believes that alternative A, expiration of the existing RUO and SUP and subsequent conversion to wilderness, would cause the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources in the short-and long-term.

AL12000 - Alternatives: General Comments

Concern Statement 35958	Commenters requested that the proposed action be defined in the EIS.
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NPS Response to Concern Statement 35958:

The DOI NEPA regulations define the term “proposed action” as “the bureau activity under consideration,” which “includes the bureau’s exercise of discretion over a non-Federal entity’s planned activity that falls under a Federal agency’s authority to issue permits.” (43 CFR 46.30). For purposes of the DOI NEPA regulations, the proposed action for this EIS is the Secretary’s decision whether to issue a permit under section 124, as discussed in the Purpose and Need section. Text has been added to chapter 1 further clarifying that the Secretary’s decision under section 124 is the NPS’s “proposed action” as defined in 43 CFR 46.30.

The DOI NEPA regulations further note that a bureau’s purpose and need (and therefore its “proposed action”) may differ from the applicant’s proposal:

When a bureau is asked to approve an application or permit, the bureau should consider the needs and goals of the parties involved in the application or permit as well as the public interest. The needs and goals of the parties involved in the application or permit may be described as background information. However, this description must not be confused with the bureau's purpose and need for action. It is the bureau's purpose and need for action that will determine the range of alternatives and provide a basis for the selection of an alternative in a decision (43 CFR 46.420(a)(2)).

While “DBOC’s proposed action” would presumably be to grant a permit under the terms it requested, that is not the “proposed action” as defined by the DOI regulations, nor is it the sole basis of the NPS purpose and need for action. Key elements of DBOC’s proposal conflict with section 124 and the NPS’s legal jurisdiction over DBOC’s operation. For example, DBOC’s proposed action included a request for a renewable permit that applied only to the onshore portions of its operation. As explained in the responses to Concern Statements 36002 and 34962, the NPS does not have authority to issue a renewable SUP to DBOC. Section 124 only authorizes one, ten-year permit. Response to concern ID 36946 explains the basis for NPS jurisdiction over the off-shore portions of DBOC’s operation. Inclusion of such elements in the purpose and need for action would be fundamentally inconsistent with the NPS’s authority over DBOC’s operation and the broader public interest. The NPS’s declination to identify DBOC’s proposal as the proposed action for this EIS is a proper exercise of NPS’s authority over DBOC’s planned activity.

See also response to concern ID 35894.

Concern Statement 36676	One commenter suggested that NPS has not considered a reasonable range of alternatives because of the similarity in impacts between the three action alternatives.
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NPS Response to Concern Statement 36676:

As noted in the EIS, section 124 provides the Secretary with authority “notwithstanding any other provision of law.” However, the Department has determined that it is helpful to generally follow the procedures of NEPA.

NEPA requires that agencies consider a reasonable range of alternatives in an EIS. The range of alternatives that must be considered is guided by the agency’s purpose and need statement. The purpose and need for this EIS is to assist the Secretary in deciding whether to exercise his authority under section 124. Section 124 limits the Secretary’s options for issuing a new permit to DBOC. A new permit under section 124 must contain the same terms and conditions as DBOC’s existing authorizations (which are the 2008 SUP and the RUO). Section 124 also authorizes only one, ten-year permit. These statutory requirements limit the alternative scenarios that can be considered under NEPA.

The EIS examines four alternatives, described in “Chapter 2: Alternatives,” which include both broad-scale and site-specific elements. The alternatives considered in the EIS include the following: alternative B considers current DBOC operations (as of 2010); alternative C considers most DBOC operations and facilities present in 2008 at the time the current SUP was signed; and alternative D considers the expansion of operations and facilities consistent with those aspects of DBOC’s requests that met legal requirements and were consistent with section 124. There are a number of variations among alternatives, including the types of shellfish that can be cultivated, the location of shellfish cultivation, the number of acres authorized for cultivation, and the amount of shellfish that may be cultivated. The variations among the action alternatives fully satisfy NPS’s obligation to consider a reasonable range of alternatives based on the NPS’s purpose and need for this EIS.

Please see Concern Statement 36002 and 36942 for additional discussion related to Issuance of a Renewable SUP and Concern Statement 36007 for more discussion related to the collaborative management alternative.

Concern Statement 36679	A commenter requested clarification regarding whether or not removal of the DBOC property and equipment at the termination of the SUP term would be authorized by the new SUP or would be subject to additional review and approval by NPS.
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NPS Response to Concern Statement 36679:

The existing RUO and SUP include specific language governing the removal of personal property and equipment from the project area. As described in the Final EIS, alternative A includes removal of infrastructure from the Estero as well as unsafe structures from the onshore site. Under the action alternatives, any new infrastructure installed by DBOC under a new permit issued by the NPS would be considered personal property of the operator and required to be removed under the new SUP. NPS would oversee DBOC’s activities to ensure that the activities comply with permit terms and to ensure protection of park resources.

AL12200 - Alternatives: Mitigation

Concern Statement 35975	<p>Commenters requested that mitigation measures be clearly identified and/or justified, including the following:</p> <ul style="list-style-type: none"> -use of electric motors -noise reduction methods -harbor seal protection area and distance from hauled-out seals -methods by which dredging disturbance can be minimized -debris cleanup/waste management -invasive species management
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NPS Response to Concern Statement 35975:

The 2008 SUP includes a number of conditions that serve to reduce the intensity of potential impacts on particular resources. Pursuant to section 124, which provides the Secretary the discretionary authority to issue a SUP with the same terms and conditions as the existing authorizations, special permit conditions from sections 4 and 6 of the 2008 SUP were included as elements common to all action alternatives. To provide additional clarity in the Final EIS, these special permit terms have been consolidated into one list under the “Elements Common to All Action Alternatives.” Impacts were described and analyzed assuming compliance with these measures under all action alternatives in chapter 4.

Per section 4(b) of the 2008 SUP, “Based upon the findings of an independent science review and/or NEPA compliance, Permittee reserves its right to modify the provisions of this Article 4. Permittee further reserves its right to incorporate new mitigation provisions based upon the findings of an independent science review.” Measures incorporated into the EIS based on public and agency comments during the NEPA process include the following:

- Clearly delineate boat access routes for use under action alternatives
- Delineate seasonal and permanent closure areas with GPS and visual demarcation
- Devise and implement methods for tracking all oyster-related watercraft in the estuary using GPS technology (MMC 2011b)
- Mark aquaculture boats for easy identification (MMC 2011b)
- Removal of European flat oyster as a potential species for cultivation (DBOC 2012b)
- Prohibition of stake culture methods

As a result of NAS recommendations, Manila clams have been removed as a species authorized for cultivation under alternative C to address concerns about the establishment of this invasive species in Drakes Estero. DBOC would be responsible for implementing harvest practices intended to minimize fragmentation and loss of *Didemnum* from oysters including modification of current harvest and distribution practices to ensure that oyster strings or bags hosting *Didemnum* are managed in a way that does not distribute *Didemnum* to other areas of Drakes Estero. Another mitigation measure identified within the Final EIS is prohibition of stake culture methods from all of the action alternatives. In addition, under alternative D, NPS would work with DBOC to ensure that onshore sound-generating equipment would be housed within new buildings constructed or otherwise enclosed to the extent practicable.

Other measures were suggested during the review of the Draft EIS, but were not incorporated into the Final EIS due to the uncertain nature of their technical or economic feasibility. Examples of these suggestions include: use of electric boat motors or paddleboats, changing culture techniques, new biodegradable materials or plastics that would not leach into water for rack construction, the use of desiccation and mild acid dips to limit the spread of noxious species, and increasing the buffer distance that shellfish operation workers would be required to maintain from harbor seals. However, if further

investigation into these potential mitigation measures indicates that they are in fact feasible, additional mitigation measures may be included as permit conditions in the future.

In addition, section 2(b) of the 2008 SUP establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the premises. Additional mitigations/permit conditions may be required by other agencies in order to obtain required local, state and federal permits.

Concern Statement 36912	A commenter suggested that mitigation measures (as identified by the commenter) be clearly justified and based on sound science. Specifically, the commenter was concerned about changes to paralytic shellfish poison sampling and the description of DBOC boat traffic.
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NPS Response to Concern Statement 36912:

The commenter interpreted the description of existing operations related to boats on the water, duration of operations, and access as mitigations for potential impacts without bases for including them. The Final EIS, pages 85-111 describe the existing operations, production, and facilities associated with the Drakes Bay Oyster Company. The estimate provided in the Final EIS is based on the information provided by DBOC during the February 16, 2011 site visit and in their letters to the NPS on December 9, 2011 and June 5, 2012. In their December 9, 2011 comment letter on the Draft EIS, DBOC stated “it is very clear that limiting DBOC to two boats and barges with a combined use of 8 hours a day would cripple DBOCs operations by limiting boat use to a fraction of the current use.” In the June 5, 2012 letter, DBOC refined the description of their boat use noting that there are a number of variable demands which affect how much they must be on the water, including tides, weather, day length, planting season, high demand occasions, etc. DBOC did provide that the current level of operation is now three boats, not two as presented in the Draft EIS. The description of DBOC boat use has been revised accordingly. Specific to alternative D, DBOC notes in their June 5, 2012 letter that “higher production levels may not require more boat trips.” This is noted in the Final EIS; however, because no assurance can be made that boat trips would not increase, such an increase remains as an assumption. This possibility remains qualitative based on available information. These estimates are an assumption of the level of effort required and are not meant to be mitigation measures or limits on operations.

Other commenter concerns related to the water quality sampling requirements associated with all shellfish producing facilities. The Draft EIS stated under the section “Elements Common to All Action Alternatives,” that the proposed boundary adjustment would move the boundary away from the main channel. NPS and CDPH would work to identify an appropriate site or sample timing (high tide) for paralytic shellfish poisoning sampling that meets health and safety requirements. The SUP would establish a specific section that documents and accommodates access to established water quality stations for the purpose of CDPH pathogen and paralytic shellfish poisoning monitoring activities..

The NPS and CDPH have reviewed sampling protocols, intent and requirements. The current SUP includes language for access to the sentinel PSP station in the main channel. Access to that station shall be made at flat wake speed within 1 hour of predicted high tide for the area. Should the second required station be outside of the operational permit area, the SUP would be modified to incorporate access to the station as appropriate. With regard to water quality monitoring stations for pathogens, CDPH generally samples sites within the permitted growing areas. No active water quality stations are maintained outside of the existing permit area. As described on page 124 of the Final EIS, it would continue to be the responsibility of DBOC, as the operator, to sample the primary stations, while CDPH maintains the secondary stations (with access provided by DBOC boats). NPS will continue to coordinate with CDPH regarding access to stations 17, 18, and 19, with respect to the established seasonal closure (March 1 - June 30). DBOC and CDPH must notify the NPS of sampling events 24 hours prior to the event. CDPH would continue to review results with the NPS annually and any changes to the monitoring program

would be proposed to the NPS for review consistent with the SUP. Exceptions for access to established water quality and PSP stations required by the California Department of Health Services will be identified as part of any SUP.

AE1000 - Affected Environment: General Comments

<p>Concern Statement 36011</p>	<p>A commenter requested that existing conditions be described as currently affected by existing shellfish aquaculture, not a pristine condition, when describing the affected environment.</p>
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NPS Response to Concern Statement 36011:

The existing conditions are described as currently affected by the existing commercial shellfish operations. Each section under the “Affected Environment” section takes the presence and activities of DBOC into account.

AE2000 - Affected Environment: Drakes Estero Setting and Processes

<p>Concern Statement 37081</p>	<p>A commenter requested that use of specific references in preparing the “Drakes Estero Setting and Processes” section be reviewed and/or revised.</p>
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NPS Response to Concern Statement 37081:

Over 850 additional items were suggested during preparation of the Final EIS. References and revisions that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 27-28 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant, including the “Drakes Estero Setting and Process” section.

<p>Concern Statement 37082</p>	<p>A commenter requested additional detail regarding the following items in the description of Drakes Estero setting and processes:</p> <ul style="list-style-type: none"> -invasive species -native clams
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NPS Response to Concern Statement 37082:

Data on ecological functions of the native clam population are lacking for Drakes Estero. The best *in situ* data on native bivalves in Drakes Estero comes from unpublished master’s theses, particularly that of Press (2005). That reference cites nine species of bivalves, all of which are already listed in chapter 3 under the heading “Bivalves” (pages 227-229). The discussion on nonnative invasive species provided in the EIS is based on best available information on this topic; nonnative invasive species are already discussed under the heading “Nonnative, Invasive, and Commercial Shellfish Species” in the “Wildlife: Benthic Fauna” section.

IA1000 - Impact Analysis: General Comments

Concern Statement 36028	Commenters questioned why the EIS does not match the National Academy of Sciences National Research Council (NAS) finding of no major adverse impact.
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NPS Response to Concern Statement 36028:

Pages 27-29 of the Final EIS address this concern. In general, the 2009 NAS report does not provide a definition or detection threshold for what a “major” adverse ecological effect would be, nor does the report indicate that the NAS use of an impact qualifier (e.g., “major”) is consistent with NEPA standards. In addition, the Final EIS does not identify a major adverse impact for any of the resource topics that were also reviewed by the 2009 NAS panel, which did not include some impact topics addressed in the Final EIS such as soundscapes or wilderness. It should also be noted that the 2009 NAS discussion is based on 2008 and 2009 operational levels.

Concern Statement 36029	Commenters requested additional detail on impacts of the alternatives, including: -impacts of plastic debris -impacts of invasive species
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NPS Response to Concern Statement 36029:

Marine Debris. The Final EIS was reviewed to ensure that marine debris was discussed under all relevant impact topics. As a result, text regarding the introduction of plastic debris from the shellfish operations into the marine ecosystem was added to relevant sections of the EIS (i.e., wetlands and other waters of the U.S.; wildlife and wildlife habitat, including fish, harbor seals, and birds; special-status species; water quality; wilderness; and visitor experience). There are no specific data available on impacts of marine debris in Drakes Estero that would satisfy the requirements for primary references as specified in the chapter 1 section “References Used For Impact Analysis”; however, some research in other types of marine settings have studied plastic contaminants in the marine environment. These have been incorporated into the text where relevant. The modifications to the Final EIS also acknowledge the history of plastic debris in Drakes Estero and reiterate that debris cleanup is a requirement of sections 3.2.2 and 3.2.3 of the 2007 Cease and Desist Consent Order and section 7(b) of the 2008 SUP and is the responsibility of DBOC. Additional detail regarding the responsibility of DBOC for removal of plastic debris is provided in chapter 2 of the EIS.

Invasive Species. The California Aquatic Invasive Species Management Plan (January 2008) issued by the California Resources Agency does not apply to actions undertaken by the National Park Service, although it may guide CDFG in its regulatory oversight of aquaculture activities. CDFG would regulate DBOC’s operation with respect to the stocking of aquatic organisms, brood stock acquisition, disease control (including limitations to transfer of organisms between water bodies), and the importation of aquatic organisms into the state. Other policies regarding invasive species and marine debris that do apply to the NPS and/or DBOC have been included in the Related Laws, Policies and Plans section of the EIS. These include Executive Order 13112 on Invasive Species; the Clean Water Act, which regulates the discharge of pollutants into navigable waters; and the California Fish and Game Code, which regulates the importation of exotic species into the state.

The implications of continued DBOC operations with respect to exotic species have been discussed extensively in chapter 4. The additional references suggested by commenters do not satisfy the requirements for primary references as specified in chapter 1: References Used For Impact Analysis.

Concern Statement 36030	Commenters stated that the EIS overstates the beneficial ecological impacts of removing commercial shellfish from Drakes Estero and/or underestimates the ecological benefits of retaining the commercial shellfish.
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NPS Response to Concern Statement 36030:

The EIS recognizes the benefits provided by filter feeding shellfish to the aquatic environment. in detail in “Chapter 3: Affected Environment.” Certain references suggested in these comments are already cited in the EIS. Additional text on positive ecosystem benefits of filter feeding bivalves has been provided under “Chapter 3: Affected Environment - Biogeochemical Cycling,” and also in “Chapter 4: Environmental Consequences” in the impact topics of eelgrass and water quality.

The absence of this benefit is mentioned in the water quality section of chapter 4, under alternative A. However, quantifying any changed environmental conditions across the entire estero if and when the shellfish operations cease is not possible. The EIS makes no statements or assumptions about whole-ecosystem effects of cultured species on resources. The impacts of commercial shellfish operations on natural resources in Drakes Estero are evaluated on a localized scale. Impacts to resources in Drakes Estero are considered in accordance with the intensity definitions as defined in the EIS, as well as relevant policy.

Concern Statement 36031	Commenters questioned the role of DBOC’s activities in the disturbance of sediment in Drakes Estero.
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NPS Response to Concern Statement 36031:

The Final EIS specifies the benefits oysters provide to water quality as filter feeders in the context of an analysis of alternatives. Similarly, the human induced disturbances to water quality caused by all activities (boating, managing oyster bags, etc.) are identified and analyzed for each alternative, regardless how small, so as to differentiate impacts between alternatives. NPS recognizes that many of disturbances caused by these types of actions (such as rotating bags) are short lived, very localized, and to some may seem trivial. Nonetheless, these types of impacts should be analyzed in the context of the intensity definitions as defined in the EIS, as well as relevant policy.

Specific references with respect to erosion underneath racks has been removed from the text as this line of discussion was almost solely based on the conclusions of Harbin-Ireland (2004), which is an unpublished thesis. Further, the specific point of erosion under racks is not substantiated by other studies (e.g., Everett et al. 1995). Given the lack of consistency in the available scientific literature, the short section on erosion under racks was removed from pages 263, 267, 268, 270, and 272 of chapter 4 in the “Impacts on Eelgrass” section.

Concern Statement 36032	Commenters state that the EIS understates the adverse impacts caused by DBOC because the EIS assumes compliance with permit conditions and requirements.
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NPS Response to Concern Statement 36032:

NPS recognizes compliance issues (such as DBOC’s ongoing operation under Cease and Desist Consent Orders from the California Coastal Commission) in chapters 1 and 2; however, the analysis in the Final EIS assumes that future DBOC operations would meet compliance requirements. As described in the NPS Operations impact analysis (pages 506-514 of the Final EIS), to effectively manage the SUP, the NPS would establish a staff position to coordinate Seashore oversight, management, and enforcement of the existing operations. This position also would be responsible for assisting with documentation of mitigation and monitoring efforts prescribed for all action alternatives. The creation of a staff position would help to ensure that DBOC operates within the terms and conditions of a new SUP.

Concern Statement 36862	A commenter stated that a Supplemental EIS is warranted.
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NPS Response to Concern Statement 36862:

The NPS does not believe a Supplemental EIS is warranted. The CEQ regulations implementing NEPA provide that agencies should prepare a supplemental EIS if (1) there are substantial changes in the proposed action or (2) there is significant new information relevant to environmental concerns and bearing on the proposed action or its impacts (40 CFR 1502.9).

The changes made to the alternatives based on public comment and the input received from reviews of the science presented in the Draft EIS do not warrant supplementation. As a result of the public comment and scientific reviews, some changes were made to the alternatives, including the inclusion of basic monitoring activities considered as part of the alternatives, rather than as a cumulative project, and the removal of the nonnative Manila clam cultivation from alternative C. In its letter of June 5, 2012, DBOC identified a few relatively minor corrections to the description of their operations that required minor updates to the alternative descriptions. DBOC corrected the number of boats used for DBOC operations; three boats are used instead of two. DBOC also included the type of cultivation method they may use for purple-hinged rock scallops. These minimal changes in the alternatives do not substantially change the impact analyses and conclusions. The Final EIS includes these modifications.

DBOC also identified its interest in concentrating the repair and replacement of racks in the first two years of any new 10 year SUP. As such, its proposal for repair/replacement of 50 racks in 2013 and 25 racks in 2014 has been included under all action alternatives in the Final EIS. These modifications do not require analysis in a supplemental EIS.

The NPS considered information and data submitted by the public during the comment period as well as the findings of independent, scientific reviews (see chapter 1 pages 28-34 for a description of these reviews and their findings). New data and information submitted during the public comment period included field-collected sound data and additional references suggested for use in the EIS. The NPS considered this information and incorporated it as appropriate. However, the use of this data did not lead to substantial changes in the alternatives, nor did it significantly change the impact analysis or conclusions in the EIS.

The independent science reviews, as described in chapter 1, provided feedback related to additional references for consideration in the EIS, improvements to impact analysis methodologies to define the data/information that is used for each impact topic as well as what is missing, and suggestions to improve the impact analyses for several impact topics, in particular socioeconomic resources and water quality. The consideration of the information obtained through these scientific reviews has improved the analysis in the EIS, but it has not led to substantial changes in the alternatives or the impact analyses and conclusions. As a result, the NPS does not believe that supplementation of the EIS is warranted.

Concern Statement 38630	A commenter requested that ecological modeling be used to predict impacts of removing commercial shellfish operations on water quality and the Drakes Estero ecosystem.
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NPS Response to Concern Statement 38630:

The impacts on water quality are analyzed using the characteristics of Drakes Estero described in the literature, any cited water quality studies from Drakes Estero itself or similar environments, and reasonable conclusions based on the science. Development of a circulation and ecological model for a complex system such as Drakes Estero would require extensive data collection and analysis, as well as a peer review process required for such a published document. The best available information indicates

that the water quality in Drakes Estero is relatively high with the commercial oyster operation present, and it is reasonable to assume (again, based on the geophysical condition of Drakes Estero as a shallow lagoon that exchanges a volume equal to that contained in Drakes Estero as described by the NAS [2009] review) the water quality would remain high if the oysters are removed. For a more detailed discussion of water quality impacts, see pages 423-441 of the Final EIS.

IA1100 – Impact Analysis: Shell Donation

<p>Concern Statement 36061</p>	<p>Commenters requested that the EIS analysis consider the value of DBOC’s shell donation to habitat restoration projects.</p>
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NPS Response to Concern Statement 36061:

DBOC has donated or sold oyster shells to support a number of habitat enhancement and restoration projects in the San Francisco Bay Area, including:

- San Francisco Bay Native Oyster Restoration Project
- San Francisco Bay Bird Observatory (SFBBO) Snowy Plover Habitat Enhancement Project
- Department Fish and Game's (DFG) Napa Plant Site Restoration Project (located at the Green Island Unit, former Cargill Solar Salt Plant)

The shell is used as a new substrate used to enhance nesting habitat or create submerged hard substrate for oyster restoration projects. The donation of shell to these projects is not a requirement of the current or any new SUP. While donated shell has been used by, and is considered a value to some regional ecological restoration efforts, there is no evidence that restoration efforts would be discontinued in the absence of shell from DBOC. Under the action alternatives, it is assumed that shell donation will continue to projects at some level. Under the no action alternative this site would no longer be a source of shell for potential restoration or enhancement projects.

IA2000 - Impact Analysis: General Methodology for Assessing Impacts

<p>Concern Statement 36049</p>	<p>A commenter suggested that the EIS should provide statistical significance levels for all data used.</p>
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NPS Response to Concern Statement 36049:

CEQ regulations require that environmental information made available to public officials and citizens be of high quality (40 CFR 1500.1[b]). The NPS used best available information to come to conclusions regarding impacts to park resources. This information includes a large number of peer reviewed articles. The scientific analysis of the Draft EIS has also been the subject of several peer reviews, as described on pages 28-34 of chapter 1. Background regarding the statistical significance of data cited in the EIS can be found in each study (if applicable), all of which are referenced in the Bibliography at the end of the document.

<p>Concern Statement 36050</p>	<p>A commenter questioned the methodology for categorizing short- and long-term impacts and recommended identifying whether adverse impacts are irreversible.</p>
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NPS Response to Concern Statement 36050:

In order to provide clear and easily identifiable impacts, short-term impacts were defined as those that “last a relatively brief time following an action and/or are temporary in nature. Short-term impacts typically are less than 1 year in duration” (page 296). Long-term impacts were defined as those that “last a relatively long time following an action and/or may be permanent. Long-term impacts typically 1 year or longer in duration” (page 296). As defined in chapter 4, a long-term impact may or may not be permanent (i.e., irreversible). Impacts on eelgrass are described appropriately in the “Impacts on Eelgrass” section, based on these parameters. With respect to the relative permanence of eelgrass scars, one overall effect of scarring will be the long-term impact resulting from continued DBOC operations under alternatives B, C, and D (i.e., although older scars may regrow, new scars would form as a result of ongoing operations). As written on page 515 of the Final EIS, the only potential irreversible loss of resources is due to the continued risk of nonnative species, especially the Manila clam, becoming established within Drakes Estero and the risk of continued spread of *Didemnum*. If these nonnative species cannot be controlled, it would represent an irreversible loss of an otherwise natural ecosystem within Drakes Estero.

Concern Statement 36051	Commenters suggested that the EIS should use concrete data to demonstrate impacts and avoid speculating about causal relationships and potential impacts.
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NPS Response to Concern Statement 36051:

The method of analysis and presentation in this EIS is consistent with the requirements of NEPA.

The impact analysis presented in the EIS is based on the best available science, as indicated on pages 27-28 of the Final EIS in the “References Used for Impact Analysis” section. The use of the word “potential” throughout the impact analysis does not indicate speculation of impacts. Documents that provide an impact analysis for compliance with NEPA are typically written in the “conditional” voice because no decision has been made at the time of preparation and the actions being described have not been implemented. Impacts are identified as “potential” to indicate this conditional nature.

Concern Statement 36052	A commenter suggested that the EIS use a net impact analysis approach.
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NPS Response to Concern Statement 36052:

CEQ regulations require that an agency consider and disclose impacts that may be both beneficial and adverse (43 CFR 1508.27). There is no direction to balance, or average beneficial and adverse impacts. In the EIS, the NPS has disclosed both beneficial and adverse impacts where they are expected, and described those impacts. The method of analysis and presentation in this EIS is consistent with the requirements of NEPA.

Concern Statement 36866	A commenter suggested that impacts be considered at a variety of scales.
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NPS Response to Concern Statement 36866:

In general, the impacts of commercial shellfish operations on natural resources in Drakes Estero are evaluated on a localized scale. As described on pages 295-296 of the Final EIS, the geographic area (or area of analysis) for the EIS includes DBOC onshore and offshore facilities and operations in and adjacent to Drakes Estero (see figures 1-3 and 1-4 of the Final EIS). The area of analysis is extended for visitor experience and

recreation, socioeconomic resources, and NPS operations. The scale used for NPS operations and visitor experience and recreation is the Seashore boundary. The area of analysis for socioeconomic resources is discussed further under that impact topic in this chapter. The EIS makes no statements or assumptions about whole-ecosystem effects of cultured species on resources. Impacts to resources in Drakes Estero are considered in accordance with the intensity definitions as defined in the EIS, as well as relevant policy. From a regulatory standpoint, the scale at which impacts to resources are assessed is localized. Further, it is important to note that, from a regulatory perspective, any documented direct impact on eelgrass would likely require mitigation irrespective of how much eelgrass is already present.

IA2200 - Impact Methodology: Baseline for Analysis

Concern Statement 36044	Commenters stated that the current conditions should be the baseline against which the impacts of all alternatives are assessed.
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NPS Response to Concern Statement 36044:

DOI NEPA regulations (43 CFR 46.415[b][1]) state, “the analysis of the effects of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives.” As noted by Bass, Herson and Bogdan, “[i]t is easy to confuse the baseline with the no-action alternative” (2001). They go on to explain “[t]he baseline is essentially a description of the affected environment at a fixed point in time, whereas the no-action alternative assumes that other things will happen to the affected environment even if the proposed action does not occur” (2001). NPS has followed this direction in the EIS. For the no-action alternative, NPS contrasted the current condition as described in “Chapter 3: Affected Environment” and the expected future condition should a new SUP not be issued. This allows the decision-maker to see what no action would look like, versus the current conditions.

To clarify how impacts on resources were evaluated, a new section titled “Format of the Analysis” has been included at the beginning of chapter 4 on pages 293-295.

IA2500 - Impact Analysis: References Used for Assessing Impacts

Concern Statement 36053	Commenters stated that the impact assessment in the EIS should be based on a comprehensive review of unbiased scientific data.
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NPS Response to Concern Statement 36053:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 27-28 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant, including the “Drakes Estero Setting and Process” section. The scientific analysis of the Draft EIS has been the subject of several peer reviews, as described on page 28-34 of chapter 1 in the section titled “Independent Reviews of Data Used in this EIS.”

Concern Statement 36054	Commenters stated the EIS should describe assumptions/limitations of the NAS (2009) report and fill in the NAS deficiencies by doing a broader literature review and analysis.
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NPS Response to Concern Statement 36054:

As described in the “References Used for Impact Analysis” section on pages 27-28 of the Final EIS, NAS 2009 did form the basis for preparation of the EIS. However, due to the limitations in scope of the NAS 2009 report, as noted on pages 23 and 236 of the Final EIS, additional references beyond those used in the NAS report were reviewed and incorporated where appropriate in preparing the EIS. More recent literature also was reviewed in preparing both the Draft and Final EISs.

Concern Statement 36389	Commenters requested that additional secondary references be included in the EIS and the existing references should include more detail to facilitate tracking of relevant information.
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NPS Response to Concern Statement 36389:

As mentioned above, the impact analysis presented in the EIS is based on the best available science, as indicated on pages 27-28 of the Final EIS in the “References Used for Impact Analysis” section. In general, secondary references were not used for the analysis, unless there was a compelling reason to do so. Examples of secondary references deemed appropriate include the letters to and from DBOC used to describe its operations. Endnotes are provided for these references for ease of access to the relevant portions of these items.

For a discussion on the use of the photographs taken of harbor seals in Drakes Estero, see the response to concern ID 36206.

The format for reference documentation in the text is the author-date method, which correlates to the “Bibliography” provided at the back of the EIS. The author-date system is the standard method of citation used by the NPS, as directed by the NPS Denver Service Center Editing Reference Manual (2010). The author-date method used by the NPS is a modified version of the author-date system recommended by the Chicago Manual of Style. In addition, to assist readers with tracking correspondence letters (a secondary source of information) endnotes are provided throughout the EIS, including direct quotations from the applicable correspondence.

Concern Statement 38638	A commenter requested information regarding what field work was conducted to describe existing conditions.
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NPS Response to Concern Statement 38638:

Preparation of the EIS was based on a review of existing documents and studies, as indicated on pages 27-28 of the Final EIS in the “References Used for Impact Analysis” section. Additional field work was limited to field reconnaissance by NPS staff to field verify wetlands and waters of the U.S. within the project area, a field reconnaissance of the property (onshore and offshore) to assist in the preparation of the Determination of Eligibility for listing on the National Register (all associated facilities and landscape), a topographic survey of the onshore operations for the purpose of determining flood zone within the coastal hazard zone, an archeology report regarding the presence of *Ostrea lurida* in Drakes Estero, and as part of the parkwide aquatic invasive project, a more specific study related to invasive species in Drakes Estero was published and reviewed (Grosholz 2011b). Contractors preparing the EIS also visited the project area on two occasions, the first visit included a tour by DBOC of the onshore operations, and the second visit included a tour by DBOC of the onshore and offshore operations.

IA3200 - Impact Analysis: Climate Change

Concern Statement 36055	Commenters felt the EIS should address the potential impacts of climate change on the resources of Drakes Estero.
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NPS Response to Concern Statement 36055:

Consistent with NPS guidance (NPS 2009g), the known and predicted impacts of climate change on resource topics within the project area are included in chapter 3 as part of the existing conditions description. For the impact analysis sections, the impacts of the alternatives on resources potentially affected by climate change are evaluated in the context of the changing environment over the 10-year period of analysis identified for the project.

Concern Statement 36903	A commenter stated that the EIS should consider the impacts of ocean acidification on west coast shellfish production.
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NPS Response to Concern Statement 36903:

The potential effects of ocean acidification on benthic fauna such as bivalves (e.g., loss of calcium in shell-building species requiring calcium carbonate) are described under the heading “Bivalves” in chapter 3 of the EIS. In addition, Olympia oyster is not currently part of the existing operation and is therefore evaluated under alternative D. Further, the archeological record suggests that Olympia oyster has never been a common inhabitant of Drakes Estero. For example, the study by Konzak and Praetzellis (2011) titled *Archaeology of Ostrea lurida in Drakes Estero, Point Reyes National Seashore* discusses in detail the archeological evidence of historic shellfish populations in Drakes Estero. The primary conclusions of this study are summarized in the following excerpt from that report: “...there is no archaeological evidence that a sizeable population of [Olympia oyster] inhabited Drakes Estero and was utilized as a primary dietary resource by the Coast Miwok.” Further, “While small populations of the Olympia oyster may have existed in the Estero and been utilized by the Coast Miwok, the relative abundance of oyster remains in Tomles Bay and their absence at all but two archaeological sites in Drakes Estero make it more likely that the oysters were brought in from Tomales Bay.” This report is available for public access on the NPS Point Reyes website.

The analysis in the EIS focuses on the impact topics within the project area. An analysis on west coast shellfish production is outside the scope of this project.

IA3300 - Impact Analysis: Water Quantity

Concern Statement 36139	A commenter requested that the EIS address the impacts on fresh water quantity.
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NPS Response to Concern Statement 36139:

Impacts on fresh water quantity are related to the amount of ground water DBOC uses for wastewater and potable uses. The amount of well water used by DBOC does not noticeably impact the availability of fresh water in the area and was therefore not retained as an impact topic for analysis in the Final EIS.

IA3400 - Impact Analysis: Invasive Species

Concern Statement 36138	Commenters requested that the EIS address invasive species as a stand-alone impact topic in addition to discussing it in other relevant topics.
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NPS Response to Concern Statement 36138:

Impact topics are generally defined in terms of particular resources or values that are subjected to impacts, rather than sources of impacts. Invasive species are not addressed as a stand-alone impact topic, because they are generally a source of impacts, rather than a park resource. The impacts of invasive species on the resources within the project area are addressed in the appropriate impact topics throughout the document.

IA4000 - Impact Analysis: Cumulative Impacts

Concern Statement 36294	Commenters stated that the EIS should consider the impacts of past actions, including those at Johnson Oyster Company and DBOC, as part of the cumulative analysis.
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NPS Response to Concern Statement 36294:

The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as impacts which result when the impact of the proposed action is added to the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7). Projects were selected as cumulative actions in the Final EIS if it was determined that a project had the potential to contribute to cumulative impacts on at least one of the affected resources in conjunction with the potential impacts of the alternatives presented in this document. The past actions considered in this EIS are bounded by approximately five years.

Because the impacts resulting from DBOC operations and facilities are closely related to previous impacts by Johnson Oyster company, the long term impacts of past DBOC and Johnson Oyster Company operations in Drakes Estero were captured in the cumulative impacts analysis by disclosing these impacts as part of the affected environment, as described in chapter 3 of the Final EIS. These impacts are discussed to the extent that information exists on past Johnson Oyster Company activities. For example, historic filling of tidal wetlands associated with the development of the onshore facilities by Johnson Oyster Company approximately 30 to 50 years ago on page 219. Continued eelgrass scarring from historic propeller damage in the channel from the onshore operations into Schooner Bay is discussed on pages 225-226. Use and introduction of nonnative, invasive, and commercial species, including shellfish species such as Kumamoto oysters and the nonnative mud snail (*Battillaria attramenaria*), are discussed on page 230.

The consideration of the regional loss of eelgrass is not an appropriate application of cumulative impact analysis, as the loss of eelgrass in other areas is outside the spatial boundary being considered in the cumulative impacts analysis in the EIS and does not equate to greater impacts to the eelgrass in Drakes Estero. Consistent with NPS guidance, climate change is not considered in the cumulative impact section, as there is not a single “action” that contributes to climate change (NPS 2009g). Instead, impacts of climate change to the project area are discussed in the Affected Environment where appropriate and impacts of the project on climate change are discussed in the “Purpose of Need for Action” section on pages 42-43 of the EIS.

IA4200 - Cumulative Impacts: Kayaking

Concern Statement 36062	Commenters requested that the EIS consider the impacts of kayakers on the resources of Drakes Estero.
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NPS Response to Concern Statement 36062:

The impact of kayakers on the resources of Drakes Estero is addressed under cumulative impacts for wildlife and wildlife habitat (harbor seals and birds), special-status species, soundscapes, visitor experience and recreation, and socioeconomic resources. Further, as stated on page 374 of the Final EIS, “[n]onmotorized boats, including kayaks, are known to disrupt hauled-out harbor seals (Becker, Press, and Allen 2011; MMC 2011b). As such, continued kayaking within Drakes Estero would result in minor adverse impacts on harbor seals.” A general description of kayaking and how it is addressed in the document is provided on page 303 of the Final EIS in the “Past, Present, and Reasonably Foreseeable Actions” section. It should also be noted that the harbor seal pupping closure applies to kayakers. Drakes Estero is closed to recreational kayak access between March 1 and June 30 annually.

IA4300 - Cumulative Impacts: Ranching

Concern Statement 36067	Commenters requested that the EIS consider the impacts of the ranches on the resources of Drakes Estero.
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NPS Response to Concern Statement 36067:

There are no dairy farms within the Drakes Estero watershed. The ranches produce beef cattle in the Drakes Estero watershed. The primary effect the ranches have on Drakes Estero is on water quality. This has been discussed relative to the state’s mandated water sampling protocols and harvesting restrictions discussed in the water quality section of chapter 3, as well as in the cumulative impact analyses in the EIS in considering pollution inputs from the pastoral watershed. Ranchers in cooperation with the NPS have installed and continue to install riparian fencing and other Best Management Practices to reduce cattle access to stream habitat.

IA4350 - Cumulative Impacts: Human-caused Noise Sources

Concern Statement 36070	Commenters requested that the EIS consider the impact of cumulative human-caused noise sources in greater detail and questioned the restoration of natural soundscape in the presence of ongoing cumulative human-caused noise sources.
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NPS Response to Concern Statement 36070:

Additional detail regarding the proportion of noise contributed by overflights to the soundscape as reported in the Volpe 2011 report is included in the cumulative impact analysis sections of the “Impacts on Soundscapes” of chapter 4 of the Final EIS. The Volpe report estimates that the change in median sound levels (L_{50}) due to all aircraft at the PORE004 site is small: 1.4 dBA in summer and 1.7 dBA in winter. Within the study area, the contribution of noise to the soundscape from DBOC’s operations to the cumulative impact on soundscapes is considered appreciable. The presence of other noise sources is not considered as mitigating the effects of DBOC noise. Management of cumulative noise sources is outside the scope of this project.

IA4600 - Cumulative Impacts: Marine Life Protection Act Initiative

Concern Statement 36371	A commenter felt the analysis of reasonably foreseeable future actions should include the upgrade of Drakes Estero to a fully protected, no-take State Marine Reserve (SMR) by CDFG and the California Fish and Game Commission (CFG) after Drakes Estero is converted to wilderness and shellfish operations cease.
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NPS Response to Concern Statement 36371:

Under the California Marine Life Protection Act, the state has established and implemented restrictions on fishing of public trust resources within State Marine Conservation Areas and Marine Reserves. The designation of Drakes Estero as a State Marine Conservation Area, and any decision regarding State Marine Reserve status is a decision of the Fish and Game Commission (CFG).

Review of the discussions related to Drakes Estero indicate that during the state planning process there was an alternative to convert Drakes Estero to a State Marine Reserve upon cessation of the aquaculture lease. This is not articulated in the final EIR adopted by the CFG. Any determination with respect to revising the reserve status of Drakes Estero is under the purview of the state and therefore is not reasonably foreseeable for purposes of the cumulative impact analysis in the EIS.

IM1000 - Impairment

Concern Statement 37198	A commenter suggested that continued commercial shellfish operations in Drakes Estero would constitute impairment of Seashore resources.
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NPS Response to Concern Statement 37198:

Under section 124, the Secretary may issue a permit to DBOC “notwithstanding any other law” including the NPS Organic Act from which the non-impairment standard derives.

BE1000 - Wildlife and Wildlife Habitat - Benthic Fauna: Affected Environment

Concern Statement 36075	A commenter requested additional detail on the effects of ocean acidification on benthic fauna.
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NPS Response to Concern Statement 36075:

The potential effects of ocean acidification on benthic fauna (e.g., loss of calcium in shell-building species requiring calcium carbonate) are described under the heading “Bivalves” in chapter 3 of the EIS (pages 227-229).

Concern Statement 36076	Commenters requested that use of specific references related to benthic fauna existing conditions be reviewed and/or revised.
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NPS Response to Concern Statement 36076:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant to the appropriate sections. Please refer to the “Benthic Fauna” section of chapter 3 (pages 227-230) for references used. Text revisions specific to these recommended changes (e.g. reference citations, etc.) are found on pages 228 and 229.

<p>Concern Statement 36077</p>	<p>Commenters requested additional or revised description of the following items regarding existing benthic species:</p> <ul style="list-style-type: none"> -location of existing nonnative populations -historic presence and special-status species status of Olympia oyster -specification of which species are native -presence of purple-hinged rock scallop in Drakes Estero -introduction of invasive species in Drakes Estero -current use of triploid stock
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NPS Response to Concern Statement 36077:

The distribution of nonnative populations outside of the production area has not been assessed in detail. However, research by Grosholz (2011) regarding the positive identification of Pacific oysters naturalizing in Drakes Estero and Tomales Bay has been added to the text and cited (under the chapter 3 “Nonnative, Invasive, and Commercial Shellfish Species” section, pages 229-230).

Data on Olympia oyster with respect to Drakes Estero are limited; the available information has been included in the EIS, and the text has been modified to provide clarification. Please refer to the “Bivalves” section of chapter 3 (pages 227-229). Any reference to Olympia oyster as a special-status species has been removed from the text.

Specification on which species are native has been added to the text in the “Bivalves” section of chapter 3 (page 227).

Data on purple-hinged rock scallop with respect to Drakes Estero are limited; the available information has been included in the EIS, and text related to this species has been modified to provide clarification. Please refer to the “Impacts on Wildlife and Wildlife Habitat: Benthic Fauna” section of chapter 4 (pages 341-356). A short description of purple-hinged rock scallop has been added to chapter 3 (page 229). Impacts are discussed where cultivation of this species is considered.

There are no studies that have analyzed the vectors associated with invasive species introductions in Drakes Estero. The language specific to this issue has been modified. Please refer to the “Nonnative, Invasive, and Commercial Shellfish Species” section of chapter 3 (page 229).

The use of reproductive diploid stock in culturing nonnative species – as opposed to non-reproductive triploid stock – and its potential implications for species introductions is discussed in the Final EIS on pages 229.

BE2000 - Wildlife and Wildlife Habitat - Benthic Fauna: Impact of Alternatives

<p>Concern Statement 36081</p>	<p>Commenters stated that the impact of removing benthic fauna habitat provided by commercial shellfish operations is understated.</p>
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NPS Response to Concern Statement 36081:

There is no specific research on the habitat quality in Drakes Estero as it relates to commercial shellfish beyond the research already cited in the EIS. The text describing the impacts of alternative A on benthic fauna were revised to acknowledge the removal of habitat for species using the type of habitat associated with commercial shellfish operations. Please refer to the “Impacts on Wildlife and Wildlife Habitat: Benthic Fauna” section in chapter 4 (page 343-346). Note that structures and bags are introduced, artificial habitats and are not natural. NPS *Management Policies 2006* (NPS 2006d, section 4.4.1) state that the NPS will maintain native plants and animals “preserving and restoring the natural abundances, diversities, dynamics, distributions...” of those species. For additional information, refer to the response to Concern ID 36334.

Concern Statement 36082

Commenters questioned the description regarding impacts of disease on benthic fauna.

NPS Response to Concern Statement 36082:

Text has been modified to clarify the statements regarding impacts related to diseases that could affect benthic fauna. Specifically, the following has been added: “In a letter dated November 15, 2010, DBOC indicated that it manages invasive species by meeting the requirements set forth by its CDFG lease and Title 14 CCR to “minimize the chances of introducing invasive species or pathological microorganisms to Drakes Estero.” (page 349). In addition, note that the phrase “...although MSX only affects the Pacific and eastern oysters” has been added to the text to clarify potential pathogen-bivalve relationships in Drakes Estero (alternative B, page 348).

Further, NAS (2009) provides the following statements concerning species introductions in Drakes Estero: “The oysters and clams cultured in Drakes Estero are nonnative species that have some risk of establishing self-sustaining populations. In the past, importations of nonnative oysters were associated with the introduction of a salt marsh snail, *Batillaria attramentaria*, and the oyster pathogenic parasite, *Haplosporidium nelsoni*.” (page 5). Also, “Although the *Didemnum* introduction cannot be attributed to local human importation, other nonnative species were introduced by the shellfish operations, including the intentionally imported shellfish — the Pacific oyster (*Crassostrea gigas*), the Kumamoto oyster (*Crassostrea sicamea*), and the Manila clam (*Venerupis [Ruditapes] philippinarum*); and two hitchhikers—a nonnative salt marsh snail (*Batillaria attramentaria*) (Byers, 1999) and a protozoan parasite of oysters (Burreson et al., 2000).” (page 21). These statements are summarized in the Final EIS on pages 348-351.

Concern Statement 36083

Commenters requested additional detail regarding the impacts on the benthic fauna of Drakes Estero due to continued commercial shellfish operations, including the following items:

- risk of genetic alterations
- predator-prey relationships
- sediment chemistry (related to suitability for native benthic fauna)
- use of chemicals and antibiotics associated with commercial shellfish operations
- possibility of genetic mining

NPS Response to Concern Statement 36083:

There is no site-specific research, or research in general, that would apply to the impact analysis of the following items:

- sediment chemistry beneath bottom bags within a setting such as Drakes Estero
- genetic alterations in Drakes Estero -“genetic mining,” as the term is used here
- displacement and re-establishment of native benthic species in Drakes Estero
- predator-prey dynamics, and the role that commercial shellfish production plays thereto, within Drakes Estero, beyond that already cited in the EIS.

Note that reference to Executive Order 13112 on invasive species has been added to the impact analysis under Conclusions in the Benthic Fauna section of chapter 4, under the impacts discussion of each alternative (pages 341-356).

The use of reproductive diploid stock in culturing nonnative species – as opposed to non-reproductive triploid stock – and its potential implications for species introductions is discussed in the Final EIS on pages 229.

The topic of pressure treated lumber used for racks is addressed in the chapter 4 water quality section. The analysis from the literature concludes that leachates from treated lumber would dramatically decline after the first few weeks of exposure to the aquatic environment. By 90 days, 99 percent of all of the leaching has occurred. Based on regulatory permit conditions that would likely be associated with rack repair activity, it is assumed that any new lumber used for rack repair would require an approved coating material in order to minimize the potential for release of copper leachates from treated wood into aquatic environments.

DBOC has indicated (DBOC 2012b) that it does not add nutrients to the water used during setting but that it does occasionally add microalgae (specifically Instant Algae® Shellfish Diet 1800™). This information has been added to the description of DBOC operations in the Final EIS; however, this action is not expected to have noticeable impacts on the resources discussed in the EIS.

Concern Statement 36085	Commenters requested that use of specific references related to impacts on benthic fauna be reviewed and/or revised.
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NPS Response to Concern Statement 36085:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant. Please refer to the “Impacts on Wildlife and Wildlife Habitat: Benthic Fauna” section in chapter 4 (page 341-356) for references used.

Concern Statement 36310	Commenters requested additional detail regarding relevant law and policy related to benthic fauna.
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NPS Response to Concern Statement 36310:

Text on policy related to benthic fauna has been added under “Laws and Policies” (pages 341-342).

Concern Statement 38488	Commenters stated that the risk of naturalized/feralized shellfish in Drakes Estero due to continued commercial shellfish operations are overstated.
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NPS Response to Concern Statement 38488:

Note that recent research by Grosholz (2011b) has identified the presence of reproducing Manila clams (independent of culture bags) and Pacific oysters growing independent of culture areas in Drakes Estero. These observations have been cited in chapter 3 under “Nonnative, Invasive, and Commercial Shellfish Species” (pages 229-230). Based on this research, these organisms are able to escape cultivation in Drakes Estero. Additionally, in the 2012 NAS review of the Draft EIS, the NAS committee recommended removal of Manila clams as an approach to reduce risk of establishment by this known invasive species along the Pacific coast. Also, note that Pacific oyster has recently been identified as an invasive species in the San Francisco Bay region (San Francisco Bay Joint Venture Science Subcommittee 2011) (EIS pages 229 and 344). Further, regarding competition and carrying capacity, the cultivated filter feeders use the same resources as native filter feeders. Interspecific competition is a reciprocally-negative interaction involving a limiting resource, which has implications on carrying capacity. The EIS makes no statements regarding interspecific competition that would require an understanding of population carrying capacity in this context.

Concern Statement 38489	Commenters stated that the risk of naturalized/feralized shellfish in Drakes Estero due to continued commercial shellfish operations are understated.
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NPS Response to Concern Statement 38489:

Note that recent research by Grosholz (2011b) has identified the presence of reproducing Manila clams (independent of culture bags) and Pacific oysters growing independent of culture areas in Drakes Estero. These observations have been cited in chapter 3 under “Nonnative, Invasive, and Commercial Shellfish Species” (pages 229-230). Based on this research, these organisms are able to escape cultivation in Drakes Estero. Additionally, in the 2012 NAS review of the Draft EIS, the NAS committee recommended removal of Manila clams as an approach to reduce risk of establishment by this known invasive species along the Pacific coast. Also, note that Pacific oyster has recently been identified as an invasive species in the San Francisco Bay region (San Francisco Bay Joint Venture Science Subcommittee 2011) (EIS pages 229 and 344).

Concern Statement 38493	Commenters stated that the risk of the spread of fouling organisms (e.g., <i>Didemnum</i>) in Drakes Estero due to continued commercial shellfish operations is overstated.
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NPS Response to Concern Statement 38493:

Recent research by Grosholz (2011b) has identified and the presence of *Didemnum* growing on eelgrass within Drakes Estero. This has also been observed in Tomales Bay. There is no specific research on the risk of spread of fouling organisms in Drakes Estero, nor is there any specific literature for research conducted in Drakes Estero that satisfies the guidelines for primary references as specified in chapter 1: References Used For Impact Analysis. The information available on this topic has been provided in the EIS. In addition, the EIS does include a monitoring component under all alternatives, which would be looking at the distribution and density of *Didemnum*. For additional discussion, refer to response to Concern ID 36082.

Concern Statement 38502	Commenters stated that the risk of the spread of fouling organisms (e.g., <i>Didemnum</i>) and other invasive organisms in Drakes Estero due to continued commercial shellfish operations is understated.
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NPS Response to Concern Statement 38502:

Recent research by Grosholz (2011b) has identified the presence of *Didemnum* growing on eelgrass within Drakes Estero. This has also been observed in Tomales Bay. There is no specific research on the risk of spread of fouling organisms in Drakes Estero, nor is there any specific literature for research conducted in Drakes Estero that satisfies the guidelines for primary references as specified in chapter 1: References Used For Impact Analysis. The information available on this topic has been provided in the EIS. In addition, the EIS does include monitoring/management component under all alternatives, which would be looking at the distribution and density of *Didemnum*. For additional discussion, refer to response to Concern ID 36082.

BI1000 - Wildlife and Wildlife Habitat - Birds: Affected Environment

Concern Statement 36110	<p>Commenters requested additional designations for the important role the project area plays for birds be included in the EIS, specifically:</p> <ul style="list-style-type: none"> -Audubon recognizes the Seashore as a Global Important Bird Area -U.S. Shorebird Conservation Plan identifies Drakes Estero as a site of regional importance
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NPS Response to Concern Statement 36110:

These designations and available information were added to the “Birds” section of chapter 3 (pages 235-239).

BI2000 - Wildlife and Wildlife Habitat - Birds: Impact of Alternatives

Concern Statement 36142	<p>Commenters stated that the adverse impacts of commercial shellfish operations on birds are understated and requested additional detail regarding:</p> <ul style="list-style-type: none"> -shellfish operation debris -use of precautionary principle -shellfishing boat trips -additional species -increased vulnerability to predators -displacement of feeding habitat -avoidance/deprivation of rest and foraging habitat
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NPS Response to Concern Statement 36142:

Text has been modified to provide additional detail for these topics in the “Wildlife and Wildlife Habitat: Birds” section of chapter 4 (pages 382-399). Specific documentation of local short-term impacts of disturbance to birds in the project area is not available due to the lack of related data in Drakes Estero. As a result, additional text included results from shorebird studies in estuarine settings similar to Drakes Estero, such as the study conducted by Kelly et al. (1996) in Tomales Bay. Impacts were not always addressed on the population-level due to the scope of the studies from similar settings.

Text regarding the introduction of plastics from the shellfish operations to the marine ecosystem was added to this section of the EIS. The modification acknowledges the history of plastic debris in Drakes Estero and reiterates the ongoing requirement of DBOC to retrieve plastic debris lost during DBOCs

operations. In their October 24, 2012 Notice of Intent to proceed with a new Cease and Desist and Restoration Order, the CCC concludes that as a result of documented discharge of marine debris in the form of abandoned, discarded, or fugitive aquaculture materials, DBOC is in violation of Section 3.2.2 of the 2007 Cease and Desist Order.

Additional detail regarding removal of plastic debris is provided in chapter 2 of the EIS.

The text was modified to include greater detail on different bird species that use Drakes Estero. Since limited data from similar settings exists for the less abundant bird species, the text focuses in part on shorebird species that are the most abundant according to available data, as well as species that may be more sensitive to disturbance (such as brant). The EIS added more analysis of potential impacts to waterbirds, such as pelican and cormorants, and a list of birds observed by White (1999) has also been added to reflect the diversity of bird species that use Drakes Estero. Despite text additions to the bird section of the EIS, the impact levels are still moderate for alternative B, C, and D. The analysis used to draw this conclusion reflects the available data for Drakes Estero and bird studies from similar estuarine settings.

Concern Statement 36145	<p>Commenters stated that beneficial impacts of commercial shellfish operations on birds is understated and requested additional detail, including:</p> <ul style="list-style-type: none"> -provision of diverse habitat -provision of food source -provision of resting habitat -provision of foraging habitat
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NPS Response to Concern Statement 36145:

Text has been modified to include greater detail on the impacts of commercial shellfish operations pertaining to roosting and foraging habitat of birds in accordance with the guidelines set forth under “References Used For Impact Analysis.” Some of the literature suggested to support beneficial impacts of commercial shellfish operations on birds are not geographically similar, or have dissimilar shellfish operation settings to Drakes Estero. Such literature was not incorporated in the EIS.

Concern Statement 36148	<p>Commenters requested that use of specific references related to impacts on birds be reviewed and/or revised.</p>
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NPS Response to Concern Statement 36148:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant. Please refer to the “Impacts on Wildlife and Wildlife Habitat: Birds” section of chapter 4 (pages 382-399) for references used.

Concern Statement 36150	<p>Commenters requested additional detail regarding relevant law and policy related to birds.</p>
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NPS Response to Concern Statement 36150:

Text has been modified to address comments on law and policy, including the MOU between NPS and USFWS. Please refer to the “Law and Policy” section of chapter 1.

Concern Statement 38510	Commenters requested additional detail and/or clarifications regarding black brant and other waterbird use of the project area.
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NPS Response to Concern Statement 38510:

The EIS has been modified to include more information regarding resting and roosting behavior for some species, as well as relevance of disturbance during spring migration. Additional literature was also cited from similar settings. The EIS has also been modified to include some additional analysis pertaining to the effects of disturbance in Drakes Estero, and draws conclusions from the impacts of disturbance on energy expenditure and reproductive success in breeding grounds. The text has also been modified to provide additional information regarding brant foraging behavior, sensitivity to disturbance, and use of eelgrass beds.

EE1000 - Eelgrass: Affected Environment

Concern Statement 36157	Commenters requested additional detail on the role of eelgrass in Drakes Estero.
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NPS Response to Concern Statement 36157:

The role of eelgrass as habitat for wildlife is also discussed under the heading “Impact Topic: Wildlife and Wildlife Habitat” in chapter 3 (pages 230-231, 235-237, and 239). Text was revised to read: “Eelgrass beds help to structure the food web (the “web” of relationships between organisms and their primary food sources) in many coastal habitats, particularly those such as Drakes Estero where eelgrass is a dominant photosynthetic organism in the system (see discussion under “Primary Productivity”). In addition, eelgrass provides important habitat for fish, invertebrates, and other aquatic organisms, as well as foraging grounds for many types of waterbirds and shorebirds, such as the black brant (for further discussion, see impact topics under “Wildlife and Wildlife Habitat”).

Concern Statement 36158	Commenters requested additional detail on the historical eelgrass conditions in Drakes Estero.
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NPS Response to Concern Statement 36158:

A revision to the text has not been made because the current and historic status of eelgrass within Drakes Estero has already been discussed in the “Impacts on Eelgrass” section of chapter 4. The EIS cites data that were considered by the National Academy of Sciences (NAS 2009) which include eelgrass coverage back to 1991. Also see discussion under Concern ID 36342.

Concern Statement 36334	Commenters requested additional detail on the relationship between shellfish filtration of the water and eelgrass productivity.
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NPS Response to Concern Statement 36334:

No specific data on the relationship between shellfish filtration and eelgrass productivity are available for Drakes Estero. Filter feeding benefits associated with oysters are acknowledged, and additional information regarding the ecosystem effects of filter feeders was added to the EIS under the heading “Biogeochemical Cycling” in chapter 3. At issue is whether the oysters in Drakes Estero dramatically improve water quality such that their removal would be quantifiably observed if measured. The only known data set where water quality parameters were measured immediately adjacent to racks and far removed from racks was collected by Wechsler (2004), who found no difference in water quality. Based on this and other literature sources, the driving force behind the water quality of the estero is the daily nutrient supply provided by Drakes Bay and Pacific Ocean, and the role of the oysters in affecting water quality in Drakes Estero is localized.

Further, as stated by NMFS Deputy Regional Administrator Kevin Chu in NOAA correspondence dated December 2011, “NMFS does not have information indicating that water quality effects from the DBOC operations benefit the overall health of eelgrass in Drakes Estero. Similarly, NMFS does not have information suggesting that eelgrass would be harmed should DBOC operations cease.” Further, Dr. Edwin Grosholz indicates that “there are really no data at all available from this system and it remains an open question entirely whether oyster filter feeding has any effect positive or negative on eelgrass” (Atkins 2012a). Also, Dr. Donna Padilla states: “Thus, there are no data to support a notion that in this system aquaculture improves water quality or habitat quality for eelgrass” (Atkins 2012a).

For additional discussion on the status of Olympia oysters in Drakes Estero, refer to Concern ID 35984.

EE2000 - Eelgrass: Impact of Alternatives

Concern Statement 36160	Commenters requested that the methodology for assessing impacts on eelgrass incorporate issues such as interannual variability.
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NPS Response to Concern Statement 36160:

Impacts to eelgrass are considered at scales that are relevant to the intensity definitions established for this EIS and define in the “Methodology” section on page 328-329.

Regarding the seasonal variability of eelgrass within the estero, the EIS makes no assertions as to the potential negative impacts of shellfish operations at the level of the whole ecosystem. Impacts are assessed at the localized level, which is consistent with impact analysis for other natural resources considered. Localized impacts to eelgrass will occur regardless of seasonal variability.

Concern Statement 36161	Commenters requested elaboration on how the eelgrass cuts were calculated and justification for use of this assessment as a basis for adverse impacts.
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NPS Response to Concern Statement 36161:

Additional clarification has been added under the “Methodology” heading on page 328-329.

The method and use of aerial photographs is based on standard methods which are described in peer-reviewed publications describing scientific studies using those methods (e.g., Zieman 1976; NPS 2008a). The eelgrass scarring represents a snapshot that does not provide any information on the duration and persistence

of the impacts. Based on the extent of scarring, and the documented need by DBOC to access the estero during low tides, it is reasonable to assume that as some scars recover, others are established. As the text describes, it is assumed that for scarring to be observed from the aerial photographs, it is a result of scarring to substrate (see the “Impacts on Eelgrass - Methodology” section of chapter 4, page 328-329).

Concern Statement 36176	Commenters requested that use of specific references related to impacts on eelgrass be reviewed and/or revised.
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NPS Response to Concern Statement 36176:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on pages 27-28 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant. Please refer to the “Impacts on Eelgrass” section of chapter 4 (pages 326-341) for references used.

With respect to Elliott-Fisk et al. (2005), this reference is a report that describes the results of several studies within Drakes Estero and Estero de Limantour. The report summarizes research that is also described in several unpublished theses which are already cited in the Final EIS (e.g., Harbin-Ireland [2004], Wechsler [2004], Press [2005]). Elliott-Fisk et al. (2005) is not a peer-reviewed document and as such does not meet the technical standards for primary reference described in chapter 1 (page 27), as follows: “Primary references are those for which evidentiary support is traceable to a source that complies with recognized standards for data documentation and scientific inquiry. For example, data pertaining directly to the activities and conditions within Drakes Estero were obtained from NPS documents and other sources that have been prepared consistent with NPS standards for scientific and scholarly activities, including relevant peer review. For research conducted in similar settings (but not in Drakes Estero itself), references were taken from peer-reviewed scientific literature.”

Concern Statement 36177	A commenter requested additional detail regarding relevant law and policy related to eelgrass.
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NPS Response to Concern Statement 36177:

The position of the U.S. Army Corps of Engineers regarding eelgrass has been added to the “Impacts on Eelgrass” section in chapter 4 of the EIS.

Concern Statement 36336	Commenters requested that the impact topic of eelgrass be dismissed due to the short timeframe for regeneration of eelgrass and therefore a lack of impacts.
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NPS Response to Concern Statement 36336:

Impacts to eelgrass are considered at scales that are relevant to the intensity definitions established for this EIS. Under these assessment guidelines, this topic may not be dismissed. Refer to chapter 1 and chapter 4 for more information relevant to guidelines for dismissal and impact analysis. Also note that the discussion regarding eelgrass impacts has been revised to include updated guidelines from the draft California Eelgrass Mitigation Policy (see Final EIS page 327).

Concern Statement 36341	A commenter requested the EIS acknowledge the presence of accumulated oyster shell debris under the racks and the associated implications for eelgrass recolonization in these areas.
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NPS Response to Concern Statement 36341:

There are no studies measuring the accumulation of shell debris under DBOC oyster racks, nor is there any specific literature for research on this topic conducted in Drakes Estero that satisfies the guidelines for primary references as specified in the “References Used for Impact Analysis” in chapter 1 (pages 27-28). To the extent that accumulated shell material can inhibit colonization, this material would be removed by hand under alternative A to reduce the area of hard substrate within the potential eelgrass beds. This is referenced in the benthic fauna section of chapter 4, as part of the alternative A impact analysis (page 331).

Concern Statement 36342	Commenters requested clarification regarding how commercial shellfish production has been judged an adverse impact on eelgrass considering recent expansion in Drakes Estero.
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NPS Response to Concern Statement 36342:

Impacts to eelgrass are considered at scales that are relevant to the intensity definitions established for this EIS (please refer to the “Methodology” section on pages 328-329). Under these assessment guidelines, the impacts fall under the criterion of “measurable change” that would negatively affect eelgrass primary productivity, which would be an adverse impact.

Regarding the doubling of eelgrass within the estero, the EIS makes no assertions as to the potential negative impacts of shellfish operations at the level of the whole ecosystem. Impacts are assessed at the localized level, which is consistent with impact analysis for other natural resources considered. Regardless of the scientific veracity of the eelgrass doubling cited in NAS (2009) (which, as indicated by Dr. Edwin Grosholz (Atkins 2012a), was based on interpretation of low resolution imagery and is unreliable), the localized effects remain.

Scientific research studying the effects of shellfish operations on eelgrass in Drakes Estero is very limited. Research cited in the analysis of impacts on eelgrass is based on an extensive review of primary scientific publications in similar settings.

The ecosystem effects of cultivated bivalves have been not been studied in Drakes Estero. As stated by NMFS Deputy Regional Administrator Kevin Chu in NOAA correspondence dated December 2011, "NMFS does not have information indicating that water quality effects from the DBOC operations benefit the overall health of eelgrass in Drakes Estero. Similarly, NMFS does not have information suggesting that eelgrass would be harmed should DBOC operations cease." Further, Dr. Edwin Grosholz indicates that "there are really no data at all available from this system and it remains an open question entirely whether oyster filter feeding has any effect positive or negative on eelgrass" (in Atkins 2012a). Also, Dr. Donna Padilla states: "Thus, there are no data to support a notion that in this system aquaculture improves water quality or habitat quality for eelgrass" (Atkins 2012a).

For more information on these topics, refer to Concern Statement ID 36344.

Concern Statement 36344	Commenters requested a discussion of potential mitigation measures in the discussion of commercial shellfish operations on eelgrass.
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NPS Response to Concern Statement 36344:

The recent public notice regarding the draft Southern California Eelgrass Mitigation Policy has been included in the EIS under the heading “Laws and Policies” (page 327), and additional clarifying text regarding mitigation has been added to the impact assessment where relevant (please refer to the “Impacts on Eelgrass” section, pages 329-341). The action alternatives in the EIS assume compliance with all identified mitigation and management activities identified in the SUP and other permit requirements. Activities such as hand removal of accumulated debris from the shellfish growing operations underneath and adjacent to the racks are anticipated to reduce hard substrate within the potential eelgrass bed areas. In addition, the Draft California Eelgrass Mitigation Policy has been published for public comment. Currently that plan identifies that for direct impacts, a ratio of 1.2 to 1 is required. Analysis of restoration success within California estuaries north of the San Francisco Bay indicate that a ratio of 4.82 to 1 is required to meet the mitigation level (see Law and Policies under Eelgrass impact analysis, chapter 4). Under the proposed action alternatives, consultation with the National Marine Fisheries Service will be conducted on documented activities and direct and indirect impacts to eelgrass.

Concern Statement 37197

A commenter stated that impacts on eelgrass are understated in the EIS.

NPS Response to Concern Statement 37197:

Impacts to eelgrass are considered in the context of intensity definitions established for this EIS. Potential impacts to eelgrass from propeller scarring, tunicate and algae overgrowth, boat wake erosion, effects on wildlife habitat, and displacement from infrastructure are all considered, and effects have been interpreted at the localized scale described in the EIS. Impacts to eelgrass have been assessed accordingly.

Statements regarding the potential ecosystem benefits of cultivated filter-feeding bivalves, particularly with respect to water clarity and sediment nutrient enrichment, are based on an extensive review of scientific literature and relevant primary references, and are described in the appropriate context of environmental/ecological setting in the EIS. The EIS acknowledges localized ecosystem benefits provided by populations of filter-feeding bivalves, whether cultivated or native.

Statements regarding consistency with NPS management policies are included in the Conclusion discussion under each alternative in the chapter 4 eelgrass and benthic fauna sections.

The quantities used to estimate impacts to eelgrass are based on a point-in-time estimate using the best available information.

F11000 - Wildlife and Wildlife Habitat - Fish: Affected Environment

Concern Statement 36197

Commenters requested additional detail on how fish habitat is provided and/or enhanced by commercial shellfish infrastructure.

NPS Response to Concern Statement 36197:

Text has been modified to provide additional detail regarding structure-oriented species. Results and conclusions of the fish study completed by Wechsler (2004) are presented, indicating that structure oriented fish species were found around oyster racks in Drakes Estero. The findings were included in the EIS and evaluated in the context that, while a shift in the fish community composition occurs near oyster racks, the racks are a type of artificial habitat which is not natural to Drakes Estero. Regardless of its

effect on the fish community, the continued maintenance of a non-natural community in Drakes Estero does not further the goal of NPS Management Policies 2006 to preserve and restore natural communities and ecosystems. Please refer to the “Fish” section of chapter 3 (pages 231-232).

FI2000 - Wildlife and Wildlife Habitat - Fish: Impact of Alternatives

Concern Statement 36195	A commenter requested additional detail on the beneficial impacts of commercial shellfish aquaculture on wild fish stocks.
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NPS Response to Concern Statement 36195:

The Final EIS includes a discussion of all relevant factors affecting fish resources within the project area, including the role of shellfish aquaculture. An analysis of the world’s oceans and fish stocks is beyond the scope of this EIS.

Concern Statement 36418	Commenters stated that removal of commercial shellfish infrastructure should not be considered a negative impact due to the habitat value provided by these structures.
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NPS Response to Concern Statement 36418:

Text has been modified to provide additional detail regarding structure-oriented species and species in the Groundfish Plan. Results and conclusions of the fish study completed by Wechsler (2004) are presented, indicating that structure oriented fish species were found around oyster racks in Drakes Estero. The findings were included in the EIS and evaluated in the context that, while a shift in the fish community composition occurs near oyster racks, the racks are a type of artificial habitat which is not natural to Drakes Estero. NPS *Management Policies 2006* for biological resource management (NPS 2006d, section 4.4 et seq.) states that “the National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.” Directives for maintaining native species include “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and, minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them” (NPS 2006d). Please refer to the “Impacts on Wildlife and Wildlife Habitat: Fish” section of chapter 4 (page 356).

Concern Statement 38565	A commenter requested that the EIS consider impacts on the Northern anchovy and Pacific sardine.
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NPS Response to Concern Statement 38565:

The fish study conducted by Wechsler (2004) in Drakes Estero reported the capture of only one northern anchovy, and no other data is available. Therefore, due to the limited data pertaining coastal pelagic species in Drakes Estero, the EIS states that it is unclear whether proposed actions under alternative A would benefit these species or their essential fish habitat. Please refer to the “Impacts on Wildlife and Wildlife Habitat: Fish” section of chapter 4 (page 359).

Concern Statement 40117	A commenter requested additional discussion of the adverse impacts of commercial shellfish operations on fish, including the following issues: -plastic debris -turbidity in the water column -depletion of nutrients by nonnative shellfish
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NPS Response to Concern Statement 40117:

The text of the Final EIS for each alternative was modified to include the possible impacts of shellfish operation debris on fish. Modified text informs the reader about debris fragments and effects related to ingestion, digestion, and entrapment of various fishes. Shellfish operation debris in Drakes Estero is evaluated in the context of the project limits for this EIS; and the modified text restates the current level of understanding as to the degree of shellfish operation debris pollution occurring in Drakes Estero, and the actions currently put in place to clean up debris from shellfish operations.

Impact analysis regarding motorboats and fish focuses on the effects of propeller damage in eelgrass as a means of habitat fragmentation. In the “Impacts to Eelgrass” section of chapter 4, the EIS acknowledges that “boat traffic can cause temporary increases in water column turbidity due to resuspension of sediments, resulting in an increase in turbidity that can reduce the depth to which sunlight penetrates the water column. Since sunlight is a requirement for photosynthesis, and plants must photosynthesize to add biomass, boat-induced turbidity can result in temporary reductions in photosynthesis and can stall or reverse biomass accumulation (Crawford 2002).” These temporary increases in water column turbidity, in combination with the higher tidal flushing in Drakes Estero, are not likely to have a measurable effect on the fish community in Drakes Estero; however, habitat fragmentation is a more measurable effect of motorboat propeller damage and the Final EIS references literature that shows the impacts on fish communities in similar environments.

Impact analysis regarding nonnative oysters and their effect on the food web and food availability for native fauna is presented in the “Impacts to Eelgrass” and “Impacts to Benthic Fauna” sections of chapter 4.

FZ1000 - Coastal Flood Zones: Affected Environment

Concern Statement 36200	Commenters question the term “flood zone” and the method used to estimate the flood zone.
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NPS Response to Concern Statement 36200:

FEMA states that not all areas subject to flooding are necessarily included on their Federal Flood Insurance maps. The FEMA Flood Control Study for Marin County (FEMA 2009) does not attempt to calculate the flood zone at Drakes Estero, and thus no flood zone was determined. While the DBOC onshore area is not mapped as a FEMA flood zone, it is known that flooding is a regular occurrence based on statements provided to the park by DBOC. In addition, an application was submitted by DBOC to repair structures at the onshore facilities damaged by flooding from a storm event in March 2011. DBOC categorized this flood event on March 20, 2011 as a “100 yr storm” in their letter to the California Coastal Commission dated February 27, 2012.

Due to the lack of any FEMA flood calculations/study for Drakes Estero, NPS elected to use FEMA flood zone results from nearby Bolinas Bay. The FEMA flood zone elevation for Bolinas Bay was analyzed against the known storm event which occurred in March 2011. The importance of the recent storm event is the ability to accurately measure the elevation of the evidence left behind by the recent

flood event through traditional land surveying techniques (i.e., field corroboration) and compare those elevations with the Point Reyes tidal gauge and Bolinas Bay FEMA flood zone elevation. A topographic survey conducted by a professional surveyor was completed in order to establish elevations of the physical evidence at the site for planning and to evaluate the extent of flooding. From this, NPS extrapolated that evidence across the entire onshore facilities to determine the estimated area of flooding from a major storm event. Any other method would conjure speculation about the effects of past flood events on the onshore facilities without any other physical evidence.

FZ2000 - Coastal Flood Zones: Impact of Alternatives

Concern Statement 36201	A commenter requested an evaluation of the recent storm event and flooding that occurred at the DBOC onshore facility in April of 2010 and any bearing that this event may have on the question of the susceptibility of this area to such events in the future.
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NPS Response to Concern Statement 36201:

The Point Reyes gauge data was evaluated for the month of April 2010. The highest reading for that month was 6.84 feet NAVD. No flood event was recorded during that month that exceeded the flood event cited in the EIS for March 20, 2011 of 8.12 feet. NPS presumes, therefore, that the commenter was referring to the flood event of March 2011 rather than the April 2010 date. See response to Concern ID 36200.

HS1000 - Wildlife and Wildlife Habitat - Harbor Seals: Affected Environment

Concern Statement 36202	Commenters requested additional description of harbor seal use of Drakes Estero and any additional factors influencing it, including elephant seals.
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NPS Response to Concern Statement 36202:

Harbor seal use of Drakes Estero is summarized in chapter 3 under the heading “Harbor Seals” (pages 232-234), on figure 3-5 (page 234), and also in chapter 4 under the heading “Impacts on Wildlife and Wildlife Habitat: Harbor Seals” (pages 369-382). Factors influencing the behavior of harbor seals within Drakes Estero have been reviewed by NAS (2009), Becker, Press, and Allen (2009, 2011), and also by the Marine Mammal Commission in their analysis and summary of mariculture effects on harbor seals in Drakes Estero (MMC 2011b). The elephant seal event that this comment is likely referring to was a point-in-time disturbance in 2003. The event was captured by the statistical analyses of Becker, Press, and Allen (2011), and further by additional statistical treatment described by the MMC (2011b). Because the elephant seal disturbance has been treated as an outlier (both statistically and in terms of harbor seal behavior), it is not appropriate to include this one event in characterizing the overall use of Drakes Estero by harbor seals. The Final EIS analysis instead relies on the summaries in the studies cited above, which have adequately accounted for this point-in-time occurrence.

Concern Statement 36360	Commenters requested that the fact that harbor seals habituate to non-threatening human activities be acknowledged.
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NPS Response to Concern Statement 36360:

No changes have been made to the text, as in their detailed reviews of this topic, neither the National Academy of Sciences (NAS 2009) nor the Marine Mammal Commission (2011) made this point with

respect to the harbor seal population in Drakes Estero. Further, the types of human activities alluded to in this comment are regulated. NPS *Management Policies 2006* (NPS 2006d, section 4.4.1) state that the NPS will maintain native plants and animals "preserving and restoring the natural abundances, diversities, dynamics, distributions..." Habituation to human activity is not consistent with this policy.

Note that in its technical review of the Draft EIS, the NAS (2012a) draws a distinction between "habituation" and "tolerance", the former indicating that seals have become accustomed to human activities, and latter suggesting that they simply "tolerate" human presence (but at some cost with respect to reduction in fitness, etc.). There was no clear direction on what this distinction means for the Draft EIS, as stated: "Harbor seals have been shown to co-occur with other human activities in San Francisco Bay and other regions (Suryan and Harvey, 1999; Grigg et al. 2002; 2004). However, no studies have yet demonstrated that this reflects habituation, rather than tolerance (Bejder et al. 2009). Thus, although harbor seals in Drakes Estero may have habituated to mariculture activities over the 80 years of farming in the Estero, it is equally plausible that they incur some fitness cost as a result of tolerating these mariculture activities."

HS2000 - Wildlife and Wildlife Habitat - Harbor Seals: Impact of Alternatives

Concern Statement 36203	Commenters requested additional detail regarding adverse impacts of commercial shellfish operations on harbor seals, including: -ongoing and potentially increasing disturbance -plastic debris
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NPS Response to Concern Statement 36203:

As stated in the response to Comment 253198 above, the Marine Mammal Commission (MMC) (2011b) report indicates that shellfish operation activity is correlated with seal behavior. This is summarized in the following from chapter 4 under the heading harbor seals (page 376): "Further, after examining individual disturbance records, MMC (2011b) concluded that, 'from time to time, mariculture activities have disturbed the seals. However, the data used in the analysis are not sufficient to support firm conclusions regarding the rate and significance of such disturbance' (MMC 2011b)."

Information on post-mortem results from dead pups recovered from the mouth of Drakes Estero has been added to chapter 4 under alternative A impacts discussion (page 373).

As described on page 373 of the Final EIS, commercial shellfish operations in Drakes Estero release marine debris into the environment, which can be ingested by harbor seals (Laist 1987; Williams, Ashe, and O'hara 2011).

Concern Statement 36204	Commenters requested that additional data be provided to support the adverse impacts on harbor seals from commercial shellfish operations.
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NPS Response to Concern Statement 36204:

The results of the recent Marine Mammal Commission study (MMC 2011b), which focused on the effects of shellfish operations on harbor seals in Drakes Estero, have been cited and summarized in the EIS. Where appropriate, text regarding impacts to harbor seals has been amended to reflect the findings of the MMC (2011b) study (please refer to pages 370-376).

Concern Statement 36205	Commenters requested additional detail regarding beneficial impacts of commercial shellfish operations on harbor seals, including protection of harbor seals from recreational visitors.
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NPS Response to Concern Statement 36205:

NPS is responsible for continued enforcement of the closure of Drakes Estero to recreational boat traffic during harbor seal pupping season. Under alternative A, gate installation would assist NPS in this enforcement. Though the recreational boating closure during pupping season was initiated to minimize impacts to harbor seals, impacts associated with kayak use during the pupping season have still been observed (e.g., NPS and volunteer monitoring reports reviewed in MMC [2011b]). The proposed gate installation under alternative A, and increased enforcement with alternatives B, C, and D, would alleviate some observed impacts to harbor seals.

Concern Statement 36394	Commenters requested that the findings of the Marine Mammal Commission report be acknowledged.
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NPS Response to Concern Statement 36394:

The results of the Marine Mammal Commission study (MMC 2011b), which focused on the effects of shellfish operations on harbor seals in Drakes Estero, have been cited and summarized in the EIS. Where appropriate, text regarding impacts to harbor seals has been amended to reflect the findings of the MMC (2011b) study (please refer to pages 370-376).

Concern Statement 36398	Commenters requested that impacts on harbor seals from commercial shellfish operations be compared to recreational activities.
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NPS Response to Concern Statement 36398:

Kayaking in Drakes Estero is not part of the actions proposed in this document. It is, however, a past, present, and reasonably foreseeable action that has the potential to impact resources addressed in the EIS; therefore, these impacts are addressed in the “Cumulative Impacts” section. The EIS assumes compliance with kayak use restrictions in Drakes Estero. For more detail on kayaking and visitor use, see discussion in the “Impact Topic: Visitor Use and Experience” section of chapter 3 (pages 267-269), and the response to Concern ID 36205. Also, note that DBOC is the only entity that is allowed in Drakes Estero during pupping season. Any kayaking occurring during this time is in violation of NPS regulations.

Concern Statement 36399	Commenters requested additional detail regarding the impacts of noise on harbor seals.
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NPS Response to Concern Statement 36399:

Available literature on noise disturbance related to marine mammal activity indicates that sound can affect seal behavior. As stated in MMC (2011b), “A seal may detect an activity using its visual, acoustic, or, possibly, olfactory senses. The sensory cue is an important consideration in the study of disturbance, but is difficult to determine because the seals live in both air and water and likely can detect both visual and acoustic stimuli over some distance (e.g., hundreds of meters). Although vision may be the primary sense for a seal hauled out on land, sound can travel efficiently through air and harbor seals on land likely depend on both senses to detect what they perceive to be potential threats. When in the water, they may depend primarily on sound to detect and assess more distant threats and vision to detect and assess closer threats. Sound levels have not been assessed in the estuary and the sound fields are likely to be complex given the shallow and variable bathymetry of the estuary and the substantial changes in water depth with the rising and falling tides.” Also, although some research – such as Acevedo-Gutierrez and Cendejas-Zarelli (2011) – has

reported dB levels for studies that found human-induced noise creating a disturbance to harbor seals, no attempt was made to determine a “threshold” for disturbance from sound levels (either in-air or underwater) measured in dB. The NMFS uses a threshold level of 90 dBA to assess a “Level B harassment” for harbor seals (i.e., resulting in behavioral change), but NMFS criteria for acoustic thresholds under the MMPA are currently under revision. Due to the uncertainty of these thresholds, no seal-specific map of noise-related impacts was created. Four maps based on human hearing is included in the “Impacts on Soundscapes” section of chapter 4 on pages 451-454 (figures 4-1, 4-2, 4-3, and 4-4.).

The Final EIS notes that DBOC operations may cause underwater noise, which may impact marine mammals in Drakes Estero (page 368). No information regarding site specific underwater noise is available. As stated on page 368: “Studies in west coast estuaries suggest that motorized watercraft are a greater threat for harbor seal disturbance relative to other human activities (such as pedestrian tourists, canoeists, or kayakers) (Suryan and Harvey 1999; Calambokidis et al. 1991). Further, there may be impacts on harbor seals related to underwater sounds produced by DBOC based on previous research on other marine mammals (NAS 2003).” As stated in the NAS (2012a) summary of its Draft EIS technical review, “There are ample peer-reviewed papers on the short-term impacts of underwater noise on marine mammals at an individual level for a few species, but little scientific evidence is available to determine the effects of noise on marine mammals at the population level.”

Concern Statement 36407	A commenter requested additional detail regarding relevant law and policy related to harbor seals.
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NPS Response to Concern Statement 36407:

Text has been revised to clarify that alternative A is consistent with relevant NPS laws and policy. Text has been added to define how alternative A would be consistent with the MMPA. See page 375 of the Final EIS.

HS2100 - Harbor Seals: Use of Photographs

Concern Statement 36206	Commenters stated that the photographs taken of harbor seals be included as evidence of impacts or lack thereof. Otherwise, a justification as to why the photographs are not used should be provided.
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NPS Response to Concern Statement 36206:

Between spring 2007 and spring 2010 more than 250,000 digital photographs were taken from remotely deployed cameras overlooking harbor seal haul-out areas in Drakes Estero. The photographs were taken at one minute intervals. These photographs are posted on the NPS web site at http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_videos.htm

Based on public comments, the NPS initiated a third-party review of the photographs with the U.S. Geological Survey (USGS), in consultation with a harbor seal specialist with the Hubbs-Sea World Research Institute. The USGS assessment (Lellis et al. 2012) focused on the 2008 harbor seal pupping season, when more than 165,000 photos were collected from two sites overlooking Drakes Estero between March 14, 2008 and June 23, 2008. The results of this review are provided in the USGS report, *Assessment of Photographs from Wildlife Monitoring Cameras in Drakes Estero, Point Reyes National Seashore* (Lellis et al. 2012) (see also discussion under chapter 1 pages 33-34). Additional information about the USGS assessment is presented under the impact topic “Wildlife and Wildlife Habitat: Harbor Seals” in chapter 4.

HS2200 - Harbor Seals: Use of Becker 2011

Concern Statement 36207	Commenters stated that the Becker 2011 reference, as reviewed by the Marine Mammal Commission, may not be a reliable source of information for impacts of commercial shellfish operations on harbor seals.
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NPS Response to Concern Statement 36207:

The results of the recent Marine Mammal Commission study (MMC 2011b), which focused on the effects of shellfish operations on harbor seals in Drakes Estero, have been cited and summarized in the EIS. Becker, Press, and Allen (2011) was reviewed in MMC (2011b), and conclusions thereto have been referenced in the EIS. As referenced in the EIS in the chapter 4, harbor seals impact analysis (page 371-376), MMC (2011b) concluded that the research of Becker, Press, and Allen (2011) demonstrated a negative correlation between shellfish operations and seal use of haul-out sites, but noted that this correlation did not necessarily imply causation. As a component of their review, MMC (2011b) conducted some additional statistical analyses based on recommendations from an independent statistician. This included consideration of other potential influences on seals such as environmental conditions, and the impacts of an aggressive seal at a nearby colony outside of Drakes Estero. After reviewing the results of these additional analyses, the MMC concluded that their results "...continue to support the hypothesis that oyster harvest...is at least correlated with seal use of the different haulout sites within Drakes Estero" (MMC 2011b).

OP1000 - NPS Operations: Affected Environment

Concern Statement 36209	Commenters requested clarification regarding the amount of money that NPS has spent managing commercial shellfish operations in Drakes Estero.
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NPS Response to Concern Statement 36209:

The maintenance of the road and parking area adjacent to DBOC are outside of any existing permits or the RUO held by DBOC, and are in the proper authority and jurisdiction of the NPS. Ongoing maintenance of the access road is the responsibility of the NPS and is conducted consistent with maintenance of all other NPS road facilities.

With regard to the administrative expenditures, the NPS is required to be responsive to any requests under the Freedom of Information Act (FOIA). Since 2007, the NPS has received more than 100 FOIA requests on this topic. This workload includes the collection, collation, review of records responsive to various FOIA requests regarding this topic. The commenter suggests that this level of effort will be reduced under issuance of a permit consistent with the action alternatives. The impact analysis for park operations in this EIS assumes that the level of administrative effort would be reduced under all alternatives considered in the EIS.

The NPS has responded to previous FOIA requests related to expenditures associated with planning and evaluation associated with the current planning process. The responses to these requests are posted at http://www.nps.gov/pore/parkmgmt/planning_reading_room.htm.

OP2000 - NPS Operations: Impact of Alternatives

Concern Statement 36210	Commenters requested clarification regarding how the full-time equivalent (FTE) staff were estimated and requested that recalculation be considered.
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NPS Response to Concern Statement 36210:

The changes to staffing levels (both FTE and part-time) described in the EIS reflect anticipated levels of staffing for specific activities including invasive species monitoring and management and differing levels of planning, oversight and enforcement with respect to the action and no action alternatives. These estimates are based on levels of effort required for similar tasks and current staff workloads. The “Impacts on NPS Operations” section of chapter 4 (pages 506-514) has been revised to clearly identify the number of additional FTE or part-staff that would be needed for each component of the no action and action alternatives, as applicable.

Concern Statement 36211	A commenter requested that the EIS acknowledge the public service provided by DBOC.
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NPS Response to Concern Statement 36211:

While DBOC’s efforts to cleanup aquaculture-related marine debris from past oyster operations are certainly appreciated by the NPS, they are also a requirement of the 2007 Cease and Desist order issued by the CCC and a requirement section 7(b) of the existing SUP.

The regular human presence in Drakes Estero cannot be regarded as a public service in an area designated as potential wilderness, because it is inconsistent with the characteristics of a wilderness. As described in the “Impact Topic: Wilderness” section of chapter 3, wilderness is defined by PL 88-577, in part as, “[a]n area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation.”

SE1000 - Socioeconomic Resources: Affected Environment

Concern Statement 35963	<p>Commenters requested additional details and/or revisions regarding the existing socioeconomic conditions. The following issues were raised:</p> <ul style="list-style-type: none"> -current NPS lease amount -shellfish production numbers and their calculation -editorial corrections -jobs provided by DBOC -taxes paid by employees -secondary economic contributions -quantification of DBOC’s economic contribution
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NPS Response to Concern Statement 35963:

The Final EIS has been revised to address these comments as follows:

The current DBOC lease is not based on the income of the operation but rather on the value of the onshore SUP area. As described in the introduction to “Chapter 1: Purpose of and Need for Action” section 124 of PL 111-88 specifies that, “extended authorization [of DBOC operations] is subject to annual payments to the United States based on the fair market value of the use of the Federal property

for the duration of such renewal. As such, and as described in “Chapter 2: Alternatives” if DBOC is issued a new permit, the operation would be required to pay the United States the fair market value of both onshore and offshore portions of DBOC.

The NPS has been working with the California Department of Fish and Game to identify the most appropriate approach for comparing and presenting shellfish production data in the EIS. Each operation provides data to the Department of Fish and Game differently, making direct comparisons difficult. Since release of the Draft EIS, the agencies have continued to work together to refine the data. It should be noted that NPS developed the socioeconomic analysis presented in the Final EIS using CDFG production data as presented in the Draft EIS and including 2011 production. The shellfish production numbers use the Proof of Use reported information including the production basis of 100 oysters per gallon and 8.5 pounds per gallon. In August of 2012, after NPS had completed this analysis, including IMPLAN modeling, CDFG notified NPS that in May of 2012 they modified their methodology for estimating some of the state shellfish production data. NPS acknowledges these changes, however, because this data was received after completion of the socioeconomic analysis, and is not anticipated to result in significant changes to NPS findings or conclusions, it has not been incorporated in the Final EIS. Revised shellfish production numbers are presented in the “Socioeconomic Resources” sections of “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences” of the Final EIS.

Editorial revisions, including those identified in the public comments, have been incorporated throughout the Final EIS.

The “Socioeconomic Resources” section of “Chapter 3: Affected Environment” provides information about DBOC employment, as reported by DBOC. During the preparation of the EIS, although requested by NPS, DBOC did not provide information pertaining to the taxes paid by DBOC and its employees. Therefore, this information has not been included in the EIS. Similarly, data is not readily available to determine secondary economic contributions associated with DBOC, such as ancillary businesses supported by DBOC as a tourist location or as a purchaser of equipment.

Concern Statement 35964	Commenters requested an estimate of the socioeconomic value of ecologic services provided by DBOC.
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NPS Response to Concern Statement 35964:

In order to provide an accurate estimate of the socioeconomic value of environmental services provided by DBOC's nonnative, commercially grown shellfish species, a complete ecosystem valuation study would need to be completed. A site-specific study of this nature would require analyses of the linkages between ecosystem structure and functions (ecosystem analysis) that would then be translated into economic values (economic analysis). This type of study is very costly and time consuming, and not easily transferable, thus making studies completed in other areas potentially not applicable to Drakes Estero. A study such as this has not been completed for Drakes Estero, as noted by NAS:

"The ecosystem resources embodied by Drakes Estero are fairly well understood and are described in the previous chapters (I through VII) of this report. The ecosystem services provided by the specific resources in Drakes Estero have not been quantified in either ecological or economic terms" (NAS 2009).

In addition, as described in pages 247-252 of the Final EIS, the physiographic characteristic of Drakes Estero, coupled with few human-caused disturbances in a relatively small watershed, are the overriding properties of Drakes Estero affecting water quality. Bivalves do capture pollutants as their food source, and can influence water quality in some estuaries. However, data suggests that Drakes Estero is a unique case where ceasing shellfish operations, and thus removing the functional ability of the oysters to filter water within Drakes Estero, is not likely to result in any appreciable differences in water quality. Therefore, the economic value of

DBOC, related to nutrient sequestering and water filtration is not likely to be measurable.

For purposes of this EIS, socioeconomic resources were described using best available information and methodologies. For more information related to socioeconomic resources, please see pages 269-283 of the Final EIS.

SE2000 - Socioeconomic Resources: Impact of Alternatives

Concern Statement 35970	Commenters questioned the use of varying geographic scales to describe socioeconomic impacts.
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NPS Response to Concern Statement 35970:

The Draft EIS analyzed socioeconomic impacts at a local (Inverness CDP), regional (Marin County), and statewide (for shellfish production only) scale; and in consideration of the impacts associated with each scale, provided one overall impact. To clarify the socioeconomic impacts associated with each level, “Chapter 4: Environmental Consequences” in the section “Impacts on Socioeconomic Resources” of the Final EIS has been revised to include conclusion statements specific to the local, regional, and statewide impacts. The methodology discussion in this section also has been revised to reflect this change. These geographic scales have been selected in consideration of what is most appropriate for the components of the socioeconomic environment and for consistency with available data. Data for many of the components of the socioeconomic environment, including housing, population, and employment are reported at a very localized level, or at the county or state level. There is limited data specific to West Marin. Therefore, West Marin was not considered a suitable scale for comparative evaluation. Any impact to socioeconomic resources that would occur within West Marin would likely be magnified in the analysis of impacts to the Inverness CDP, which is much more localized. West Marin was mentioned in the methodology of the Draft EIS for context, but has been removed from the Final EIS to reduce confusion about the scale of the analysis.

Shellfish operations are dispersed throughout California and not concentrated within one county or region. Therefore, evaluating operations at a scale smaller than the state level would distort the role of that operation in the larger market. In addition, much of the available data related to the shellfish market is provided at a state level. As such, it was determined that the state level was the most appropriate scale for the evaluation of shellfish production. The NPS acknowledges that impacts to the shellfish market associated with DBOC would be greater at the county level than the state level. For comparison, shellfish production data has been incorporated into the socioeconomic resources sections of “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences” of the Final EIS. However, the overall conclusions for impacts to socioeconomic resources did not change.

Concern Statement 35971	<p>Commenters requested additional detail regarding the impacts on socioeconomic resources under alternative A, including:</p> <ul style="list-style-type: none"> -consideration of current economic conditions -removal of California's last cannery -loss of jobs and housing -loss of shellfish production and cost of replacement -loss of local income and tax revenue -exacerbation of national seafood deficit -loss of revenue provided by visitor attraction -consumers’ loss of local, natural product and source of protein
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NPS Response to Concern Statement 35971:

To address comments on impacts to socioeconomic resources, additional detail has been incorporated into “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences” of the Final EIS. Specifically, the socioeconomic resource sections in each chapter have been revised to acknowledge the nation’s current seafood deficit. Additionally, information about the impact of DBOC payroll and visitor spending on the local and regional economy has been incorporated into the socioeconomic resource discussions in chapter 3: and chapter 4.

In addition, the socioeconomic analysis has been updated in the Final EIS to include DBOC’s contribution to the overall local economy. As described on pages 281-282 of the Final EIS, an input-output methodology employing IMPLAN software has been used to estimate the economic impact of DBOC operations on the Marin County economy. IMPLAN was chosen because of its ability to construct a model using data specific to Marin County while maintaining rich detail on impacts for hundreds of industrial sectors. In addition to being widely used in regional economic analysis, the model and its methodology have been extensively reviewed in professional and economic journals. IMPLAN software also was used to calculate the economic impacts of the Seashore on local communities. Input-output models, such as IMPLAN, map the linkages of inter-industry purchases and economic output within a given region.

Impacts to local food sources were considered during development of the EIS but were dismissed as an impact topic because other proteins, such as beef, poultry, or finfish, also are produced in the vicinity of DBOC. In addition, other sustainable shellfish operations, such as the Tomales Bay Oyster Company and the Hog Island Oyster Company, both of which are in Tomales Bay proximal to DBOC (approximately 15-20 driving miles), contribute to the local oyster and clam supply. See pages 43-44 in “Chapter 1: Purpose of and Need for Action” in the section “Issues and Impact Topics” for the detailed dismissal of this impact topic.

The EIS acknowledges that DBOC operates the last onsite oyster cannery in California. The loss of this oyster cannery would not be likely to result in a noticeable impact to socioeconomic resources, beyond the impacts associated with the loss of DBOC. Identifying potential replacement canneries is outside the scope of this EIS.

The cost to replace DBOC is too speculative to estimate within the EIS. Replacement would not be the responsibility of the NPS and could occur anywhere within the state. As noted above, the Final EIS acknowledges that local growers state that they cannot accommodate the loss of production associated with closing DBOC (see response to Concern 35976).

As discussed in “Chapter 3: Affected Environment” in the section “Impact Topic: Water Quality” the California Department of Public Health, Division of Drinking Water and Environmental Management Preharvest Sanitation Unit requires DBOC to periodically collect and analyze meat and water samples. This sampling helps to ensure food safety and restricts shellfish harvesting during periods when fecal coliform or marine biotoxin levels may temporarily exceed existing standards. Water and meat sampling is not a service uniquely provided by DBOC. Therefore, the water and meat sampling conducted at DBOC is not considered in chapter 4 of the EIS.

Current economic trends are considered as part of the cumulative impacts discussion in the “Methodology for Assessing Impacts” section of chapter 4, and associated impacts are evaluated in the “Impacts to Socioeconomic Resources” section of the same chapter. Impacts associated with the loss of jobs, housing, shellfish production, and visitor attraction also are evaluated in the socioeconomic impacts section of chapter 4 of the EIS.

Concern Statement 35976	Commenters stated that jobs and production lost at DBOC could not be replaced by other growers such as Tomales Bay.
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NPS Response to Concern Statement 35976:

The impacts to socioeconomic resources discussed in “Chapter 4: Environmental Consequences” of the Draft EIS are not based on an assumption that other shellfish operations in the area (or within California) could absorb jobs and/or production if operations at DBOC cease. No such assumptions were made in the Draft EIS. The Final EIS has been revised to clarify this and to note that area growers, such as Tomales Bay have stated that they cannot accommodate the loss of DBOC. However, the overall conclusions in the Draft EIS did not change. It should be noted however, that production levels in other parts of the state have increased at a greater rate than production increases in Drakes Estero. For example, in 2010, DBOC production increased by 28 percent over 2009 production levels, during this same period, the California oyster market increased 43 percent (CDFG 2011e). This pattern is also apparent within Marin County. Between 2007 and 2008 DBOC’s share of the Marin County Pacific oyster production was 69 percent (CDFG 2011e). Due to increased production in Tomales Bay in 2008 and 2009, DBOC’s share of the county oyster and shellfish markets was closer to 50 percent between 2009 and 2011 (CDFG 2011e). For consistency, the National Park Service relied on information from the California Department of Fish and Game data related to current production levels and did not contact each individual shellfish operation in the area.

Concern Statement 35977	Commenters stated that impacts of alternative A on socioeconomic resources were overstated in the EIS.
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NPS Response to Concern Statement 35977:

NPS recognizes that during the latter part of Johnson Oyster Company ownership and during the first couple years of DBOC ownership (through 2006), oyster production within Drakes Estero was significantly lower than current conditions. Information has been added to the socioeconomic resources section in “Chapter 3: Affected Environment” of the EIS to acknowledge and clarify this. However, because economic conditions vary, it cannot be assumed that alternative A would result in conditions similar to when shellfish production in Drakes Estero was lower. As described in the socioeconomic resources sections of chapters 3 and 4 of the EIS, the evaluation of impacts to socioeconomic resources was not limited to the local, regional, and/or statewide shellfish market. The analysis also included a consideration of impacts to other socioeconomic conditions such as employment, taxes, revenue for other types of businesses, and changes to demographic conditions (i.e., population, housing).

SP1000 - Special-Status Species: Affected Environment

Concern Statement 36215	Commenters requested that the EIS state that Drakes Bay is part of the Leatherback Conservation area created by the Turtle Island Restoration Network's Sea Turtle Restoration Project.
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NPS Response to Concern Statement 36215:

The EIS considered the designated critical habitat of the leatherback sea turtle, which is a protected resource under the ESA. The project/action area considered in the EIS is located within Drakes Estero. The designated critical habitat for the leatherback sea turtle was reviewed by NPS and NMFS and Drakes Estero is not part of the turtle’s critical habitat area. Drakes Bay is part of the turtle’s designated critical habitat area, but is located outside of the project/action area.

SP2000 - Special-Status Species: Impact of Alternatives

Concern Statement 36220	Commenters questioned whether or not species were present within the study area and stated that the EIS should not include impacts for species that are not present.
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NPS Response to Concern Statement 36220:

After further consultation with relevant agencies, the “Special-Status Species” sections have been modified using the best available data to retain two ESA protected resources, the central California Coho salmon critical habitat and the central California steelhead. The Coho salmon’s designated critical habitat is located within the project/action area. Steelhead occur within the Drakes Estero watershed and therefore use Drakes Estero during migration. The text of the EIS has been modified to clarify foraging behavior of Coho salmon and steelhead as it pertains to eelgrass.

Upon further review of available data and additional consultation with relevant agencies, the determination of less than minor impacts has been identified for Myrtle's silverspot butterfly, California red-legged frog, leatherback sea turtle, California least tern, and western snowy plover and/or their critical habitat. As a result, these species were dismissed from further analysis in the Final EIS. See pages 38-39 of the Final EIS for the dismissal justification.

Concern Statement 36221	Commenters requested clarification as to why the EIS finds adverse impacts on special-status species when the 1998 EA for improvements at this site did not.
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NPS Response to Concern Statement 36221:

The relationship of the 1998 EA to the current EIS is described on page 66 of the Final EIS. The 1998 EA examined the potential impacts associated with the proposed improvements at the onshore portions of Johnson Oyster Company. Per the EA “No special-status species, such as threatened or endangered plants or animals, are found in the project area. Brown pelicans, brandt geese, and peregrine falcons are known to occur in the vicinity of the project area” (NPS 1998a, page 10). However, per informal consultation with the FWS and other relevant agencies during scoping of the EIS, potential species and/or their critical habitat were identified within the project area (which includes both onshore and offshore areas). The initial analysis of potential impacts considered that negligible to minor impacts may occur for several species and/or their critical habitat (Myrtle’s silverpot butterfly, California red-legged frog, central California Coho salmon, central California steelhead, leatherback sea turtle, western snowy plover, and the California least tern. Upon further review of available data and additional consultation with relevant agencies, the determination of less than minor impacts have been identified for Myrtle's silverspot butterfly, California red-legged frog, leatherback sea turtle, California least tern and western snowy plover or their critical habitat. Therefore, the EIS has been revised to only consider in full detail the impacts on the central California Coho salmon critical habitat and the central California steelhead in the special-status species and water quality sections.

Concern Statement 36222	A commenter requested additional detail on the potential impacts of plastic debris on leatherback sea turtles.
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NPS Response to Concern Statement 36222:

Despite recent changes, the designated critical habitat for the leatherback sea turtle was reviewed by NPS and NMFS and Drakes Estero is not part of the turtle’s critical habitat area. In addition, neither leatherback

sea turtles nor their prey species are known to occur in Drakes Estero. As a result, the text of the EIS has been modified excluding the leatherback sea turtle and its critical habitat from the special-status species section. Impacts related to marine debris are discussed under the relevant impact topic sections.

Concern Statement 37124	<p>Commenters requested additional detail regarding impact of commercial shellfish operations on special-status species, including:</p> <ul style="list-style-type: none"> -additional species -assumption that more eelgrass is a beneficial impact -consideration of potential future habitat
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NPS Response to Concern Statement 37124:

As described in chapter 3 (pages 239-240) and chapter 4 (pages 400-401), the USFWS was contacted for a list of threatened and endangered species and designated critical habitats that may be within the project area. Information on possible threatened or endangered species, candidate species, and species of special concern was also gathered by the NPS from past studies and plans. NPS determined that none of the federally listed plant species in the USFWS results have potential to be affected by the proposed actions within the project area. Further, NPS determined that seven of the federally listed animal species have potential to exist within the project area. As described in chapter 1 (pages 38-39), five of the federally listed animal species were dismissed from further analysis in the EIS due to a lack of designated critical habitat in the project/action area, unconfirmed presence of the species in the project/action area, or the potential for less than minor impacts on the species and/or their critical habitat. These include Myrtle’s silverspot butterfly, California red-legged frog, leatherback sea turtle, western snowy plover, and California least tern.

Therefore, the EIS text has been modified to only include the central California Coho salmon critical habitat and the central California steelhead in the special-status species section. The level of impact for these species has not been modified. Long-term minor impacts are appropriate for the Coho salmon critical habitat and steelhead based on the minor impacts to habitat, including (but not limited to) eelgrass. The text of the EIS has been modified to clarify the link of eelgrass impacts to impacts for fish. Further, additional text has been included to describe the effects on salmonids of copper leachates released from treated wood into aquatic environments. This pertains to the potential for repair and replacement activities in 2013 and 2014, as well as annual maintenance requirements.

Based on the best available information and additional consultation with relevant agencies, despite the presence of freshwater and estuarine systems adjacent to the project/action area, the California red-legged frog and its critical habitat would not be impacted by the alternatives as proposed in the EIS. Critical habitat is evaluated based on what is currently present, and past impacts are not incorporated into such evaluations. The frogs do occur in areas adjacent to the project area and in habitat areas adjacent to Home Bay; however these areas are not expected to be affected by the alternatives. Therefore, the determination in the EIS is considered less than minor and is dismissed from further analysis. As a result, the text of the EIS has been modified and the California red-legged frog has been removed from the special-status species section. Future restoration efforts are not considered as part of the proposed action for this EIS; therefore the impact of restoration on California red-legged frog and its critical habitat is not addressed.

The Final EIS was reviewed to ensure that marine debris was discussed under all relevant impact topics. As a result, text regarding the introduction of plastic debris from the shellfish operations into the marine ecosystem was added to the discussion of impacts of DBOC operations on special-status species in chapter 4. There are no specific data available on impacts of marine debris in Drakes Estero that would satisfy the requirements for primary references as specified in the chapter 1 section “References Used For Impact Analysis”; however, some research in other types of marine settings have studied plastic contaminants in the marine environment. These have been incorporated into the text where relevant. The modifications to the Final EIS also acknowledge the history of plastic debris in Drakes Estero and reiterate that debris cleanup is a requirement of sections 3.2.2 and 3.2.3 of the 2007 Cease and Desist

Consent Order and section 7(b) of the 2008 SUP and is the responsibility of DBOC. Additional detail regarding removal of plastic debris is provided in chapter 2 of the EIS.

Concern Statement 37125	A commenter requested that use of specific references related to the leatherback sea turtles and western snowy plovers be reviewed and/or revised.
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NPS Response to Concern Statement 37125:

Upon further review of available data and additional consultation with relevant agencies, the determination of less than minor impacts has been identified for leatherback sea turtle, California least tern, and western snowy plover or their critical habitat. Therefore, these species have been moved to the “Impact Topics Considered but Dismissed from Further Analysis” section of chapter 1. See page 40 for the justification for dismissal.

SS1000 - Soundscapes: Affected Environment

Concern Statement 36223	<p>Commenters requested alternate descriptions of the soundscape within the project, including:</p> <ul style="list-style-type: none"> -use of the L_{eq} instead of the L_{50} -use of additional measurements taken on site -clarification of the term “high ambient sound”
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NPS Response to Concern Statement 36223:

The text in chapter 3 describing the soundscape within the project area has been revised in the Final EIS to discuss these metrics in relation to L_{eq} . L_{eq} is unsuitable as an estimate of background conditions because its value is most strongly affected by the loudest sound events. The L_{50} metric provides a limited perspective of varying sound levels; therefore, the L_{90} metric was included to offer a more complete characterization of the background levels that could act to mask DBOC noise sources. The use of L_{50} to evaluate conditions in units of the national park system has been a standard practice for more than 20 years, which arose from collaborative work between NPS, the John A. Volpe National Transportation Systems Center, and industrial consulting firms HMMH and Wyle Laboratories, Inc. The use of L_{90} also is recommended by ANSI Standard 12.9-1.

Measurements taken on site were considered during establishment of a range of possible noise levels associated with DBOC operations. Discussion of these measurements are included in the “Impact Topic: Soundscapes” section of chapter 3 of the Final EIS.

Use of the term “high ambient sound” was revised.

SS2000 - Soundscapes: Impact of Alternatives

Concern Statement 36224	<p>Commenters requested additional detail and consider alternate methods of analyzing the impacts on the project area soundscape. Issues include:</p> <ul style="list-style-type: none"> -consideration of the noise emitted by DBOC employee radios -consideration of the noise emitted by cars -consideration of noise emitted by planes -consideration of noise control methods -coordination with DBOC to reduce noise -use of a different noise model -dissipation of noise
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NPS Response to Concern Statement 36224:

The Final EIS mentions radios as an anecdotal nuisance for visitors in the “Impacts on Visitor Experience and Recreation” section of chapter 4, and it is mentioned qualitatively as a source of human-caused noise in the “Impacts on Soundscapes” in chapter 4. No specific information is available on the frequency of use or volume; therefore, the impact analysis regarding soundscapes focuses instead of the major sources of noise related to DBOC operations.

Although cars do contribute noise to study area, the potential noise contribution by these vehicles could vary greatly depending on the vehicle. There are no data available on the frequency of vehicle use at the site. Therefore, as above, use of automobiles at the site is acknowledged but is not included in the quantitative analysis of primary noise-emitting equipment.

Additional detail regarding the proportion of sound contributed by overflights to the soundscape as reported in the Volpe 2011 report is included in the cumulative impact analysis sections of the “Impacts on Soundscapes” of chapter 4 of the Final EIS. The Volpe report estimates that the change in median sound levels due to all aircraft at the PORE004 site is small: 1.4 dBA in summer and 1.7 dBA in winter. According to recent data collection, overflights account for 13 percent (in the summer) to 17.6 percent (in the winter) of audible sounds at the PORE004 site located on the bluff of Drakes Estero (Volpe 2011). Within the study area, the contribution of noise to the soundscape from DBOC’s operations to the cumulative impact on soundscapes is considered appreciable.

Under alternative D, NPS would work with DBOC under alternative D to ensure that onshore sound-generating equipment would be housed within new buildings constructed or otherwise enclosed to the extent practicable.

Regarding the method of analysis, additional data was reviewed and included in the analysis (including an additional review of the data collected for the Volpe 2011 report as well as discussion of data collected on site by Environ in 2011). Additional suggestions regarding more detailed and precise modeling were not implemented. It is very unlikely that more detailed knowledge of the timing and location of equipment usage would substantially alter the analysis or conclusions presented in the Final EIS. The current analysis assumes that DBOC activities generate noise for four hours a day and that the quietest piece of onshore equipment spreads noise well into the congressionally designated potential wilderness in Schooner Bay.

VE1000 - Visitor Experience and Recreation: Affected Environment

<p>Concern Statement 36226</p>	<p>A commenter stated that services offered by DBOC should be considered a visitor service.</p>
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NPS Response to Concern Statement 36226:

DBOC does not operate within the pastoral zone at Point Reyes National Seashore. “Visitor services” are public accommodations, facilities and services that are necessary and appropriate for public use and enjoyment of the unit of the National Park System in which they are located that are provided to park visitors for a fee or charge by a person other than the National Park Service (16 USC 5951(b); 16 USC 5952; 36 CFR 51.3).

The primary focus of DBOC’s operation is commercial sale of shellfish to restaurants and the wholesale market outside the park. Those services are not principally for the public use and enjoyment of Point Reyes National Seashore. Consequently, they do not qualify as a “visitor service” for purposes of a concession contract. Even though DBOC’s activities do not qualify as a visitor service, additional

analysis has been added to the Final EIS to address the experience of those individuals who come to the Seashore for the primary purpose of visiting DBOC's facility

<p>Concern Statement 36430</p>	<p>Commenters requested additional detail on the services provided to park visitors at DBOC be included in the EIS.</p> <ul style="list-style-type: none"> -cultural/interpretive/educational experience -tours -bathrooms -telephones -Cardiopulmonary Resuscitation (CPR) and first aid -Americans Disabilities Act (ADA) accessible facilities -sampling -area clean up
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NPS Response to Concern Statement 36430:

The section "Impact Topic: Visitor Experience and Recreation" in "Chapter 3: Affected Environment" of the Final EIS has been revised to incorporate additional information about the visitor experience and recreational opportunities provided at DBOC. In particular, information about the educational tours/opportunities and other experiences provided to visitors at DBOC has been incorporated into chapter 3 of the Final EIS. These experiences include eating/buying oysters and education about the history of agriculture and aquaculture in Point Reyes National Seashore, the benefits of oysters (both as a food source and within the coastal ecosystem), and sustainable farming. The Final EIS also has been revised to note that DBOC provides restroom and telephone facilities for visitors is ADA accessible, as required by law, and has staff trained in CPR and first aid.

The "Impact Topic: Visitor Experience and Recreation" section of chapter 3 also has been revised to include a discussion of the cultural experience provided at DBOC related to the preservation of local traditions. However, it should be noted that, as described in the section "Issues and Impact Topics Considered but Dismissed from Further Analysis" in chapter 1 the California State Historic Preservation Officer has concurred that none of the facilities associated with DBOC's operation are eligible for listing on the National Register of Historic Places. In addition, as also discussed in the "Impact Topics Dismissed from Further Analysis" section, no eligible cultural landscapes have been identified in the project area.

Impacts to the DBOC visitor experience have been incorporated into the "Visitor Experience and Recreation" impacts analysis presented in "Chapter 4: Environmental Consequences" of the Final EIS. These revisions are discussed below in the responses to the VE2000 concern statements.

<p>Concern Statement 38590</p>	<p>A commenter requested the EIS include additional detail from the Point Reyes National Seashore Association (Responsive Management) 2003 survey.</p>
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NPS Response to Concern Statement 38590:

Additional information from the Responsive Management report to the Point Reyes National Seashore Association (Responsive Management 2003) has been incorporated into the Final EIS, including the percentage of respondents that stated they would like to see more wilderness at the Seashore (43 percent), and the percentage that felt it should stay the same (38 percent).

In addition, the California State Historic Preservation Officer has concurred that none of the facilities associated with DBOC's operation are eligible for listing on the National Register of Historic Places. In addition, as also discussed in the "Impact Topics Dismissed from Further Analysis" section, no eligible cultural landscapes have been identified in the project area. Therefore, data related to the preservation of

historic buildings has not been included in the Final EIS. In addition, the statistics about preserving small dairy and beef ranches has not been incorporated because the proposed action would have no impact on beef and dairy operations within the Seashore.

In general, the “Visitor Experience and Recreation” sections of chapter 3 and chapter 4 of the Final EIS have been revised in incorporate additional information about the visitor experience and recreational opportunities provided at DBOC, including a discussion of the cultural experience provided at DBOC related to the preservation of local traditions.

Concern Statement 38591	A commenter requested the EIS quantify the percentage of DBOC customers that are not park visitors.
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NPS Response to Concern Statement 38591:

As described in the EIS, DBOC estimates that annual visitation for the oyster company is 50,000, approximately 2.5 percent of Seashore visitors. Specific data regarding the percentage of DBOC visitors that travel to the Seashore solely to visit the oyster company were not available at the time of report preparation; however, it is likely that many of the annual visitors to DBOC also visit other areas during their trip to the Seashore. All vehicle traffic to DBOC must travel over Sir Francis Drake Boulevard., which is monitored by the Seashore to estimate overall Seashore visitation. However, this approach does not provide an accurate measure of DBOC-only visitation because Sir Francis Drake Boulevard is a primary Seashore road that also connects visitors to a variety of popular sites within the Seashore, such as Point Reyes Beach and Point Reyes Lighthouse.. Although it is most likely that only a small percentage of the DBOC visitors do not use other areas of the Seashore, as a conservative approach to the socioeconomic impacts analysis, the Final EIS evaluates the impacts that would result if none of the current DBOC customers would visit other portions of the Seashore.

VE2000 - Visitor Experience and Recreation: Impact of Alternatives

Concern Statement 36227	Commenters stated that other similar operations cannot accommodate additional visitors should DBOC not be issued a new 10-year SUP.
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NPS Response to Concern Statement 36227:

The impacts to visitor experience and recreation discussed in “Chapter 4: Environmental Consequences” of the EIS are not based on the assumption that all opportunities available at DBOC would be provided by other shellfish operations. This text was included as a suggested offset for the loss of DBOC, rather than an assumed replacement. Based on public comments on the Draft EIS, this statement has been removed from the Final EIS, and the Final EIS has been revised to clarify that other area shellfish operations do not anticipate they could accommodate an increase in visitors due to the loss of DBOC.

Concern Statement 36433	<p>Commenters stated that the Draft EIS understates the impact of DBOC on Seashore experiences and requested the consideration of additional impacts, including:</p> <ul style="list-style-type: none"> -the smell of exhaust and oysters from commercial shellfish operations -views of Drakes Estero -presence of oyster shells on the shoreline -navigation around DBOC racks and bags -plastic debris
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NPS Response to Concern Statement 36433:

Additional information has been added to the “Impacts to Visitor Use and Experience” section of “Chapter 4: Environmental Consequences” of the Final EIS to more fully describe the adverse impact some visitors associate with DBOC. The Final EIS has been revised to clearly acknowledge that while some Seashore visitors want to experience the opportunities at DBOC, others feel its presence interrupts the surrounding pristine views and opportunities for solitude. Chapter 4 of the EIS notes that the presence of DBOC results in plastic debris in Drakes Estero and the surrounding shoreline, racks and bags within Drakes Estero, and interrupted natural views within Drakes Estero. Additional information has been incorporated into the Final EIS to reiterate these elements as well as consider that hikers and kayakers may experience sights, smells, or sounds associated with routine shellfish harvest and onshore processing operations, which may detract from the natural surroundings. In addition to visual intrusions, these odors detract from visitor enjoyment of the natural surroundings. Each of these elements has been considered and is factored into the overall impact assessment presented in the “Impacts to Visitor Experience and Recreation” section of chapter 4 of the Final EIS.

Concern Statement 37431	<p>Commenters stated the Draft EIS undervalues the experience provided to visitors at DBOC and requested consideration of additional elements such as:</p> <ul style="list-style-type: none"> -annual DBOC visitation -educational experiences and services provided by DBOC -picnic facilities -general public enjoyment of DBOC
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NPS Response to Concern Statement 37431:

As described in the concern statements above for VE1000, the “Visitor Experience and Recreation” section of “Chapter 3: Affected Environment” of the Final EIS has been revised to incorporate additional information about the visitor experience and recreational opportunities provided at DBOC. Information also has been added to the “Impacts to Visitor Use and Experience” section of “Chapter 4: Environmental Consequences” of the Final EIS to consider impacts to the DBOC visitor experience and recreational opportunities. The Final EIS has been revised to clearly acknowledge that although impacts to visitor experience and recreation are evaluated at a park scale, some Seashore visitors want to experience the opportunities at DBOC, while others feel its presence interrupts the surrounding natural environment and opportunities for solitude. Chapter 4 of the Draft EIS notes the annual visitation to DBOC and the opportunities provided to visitors by DBOC. However, the Final EIS has been revised to recognize the impacts to the DBOC visitor experiences in a manner consistent with the impact analysis for the visitor experience within the Seashore as a whole. In particular, the visitor experience and recreation section has been expanded to include more information about DBOC visitation and the educational experiences and services provided by DBOC, including a discussion of the existing picnic facilities and the general public enjoyment of DBOC. For consistency, the intensity definitions in the “Impacts to Visitor Experience and Recreation” section of the Final EIS have been modified so that they consider the DBOC visitor experience and other Seashore experiences consistently.

Concern Statement 39314	<p>A commenter requested that the impact of alternative D on the Coast Guard Communications Area Master Station Pacific (CAMSPAC) facility be addressed.</p>
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NPS Response to Concern Statement 39314:

The impact of alternative D on the CAMSPAC facility has been addressed in the Final EIS in the “Impacts on Visitor Experience and Recreation” section.

WE1000 - Wetlands and Waters of the U.S.: Affected Environment

Concern Statement 36228	A commenter stated that the term "wetland" is not correctly defined.
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NPS Response to Concern Statement 36228:

This section in the Final EIS has been re-titled “Wetlands and Other Waters of the U.S.” to more completely cover all jurisdictional areas. The definition used in chapter 3 accurately captures the definition of a wetland as cited in federal regulations. Furthermore, the term wetland, as applied in the EIS, includes those items described in Cowardin et al. (1979) on page 3. The Final EIS has been revised to include this section of Cowardin et al. for clarification. All areas below the high tide line are jurisdictional waters of the US. The comment refers to subtidal as below the high tide mark. The correct interpretation of subtidal is below the low tide mark, or continuously submerged. The subtidal region of the estero is where the racks are located. Those areas between the low tide and high tide are intertidal (exposed and flooded by tides). This area is used for the placement of culture bags and trays. The intertidal zone where the bags and trays are placed meets the definition of a wetland.

Concern Statement 36229	A commenter requested that impacts from potential sea level rise on wetlands be included.
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NPS Response to Concern Statement 36229:

Impacts on sea level rise are considered both as part of the existing conditions imposed on wetlands as well as a consideration in the discussion of impacts (see Concern ID 36230 below). The rate of sea level rise will not be altered by any of the proposed alternatives, and the effects of sea level rise on wetlands would be the same under all alternatives.

Concern Statement 37176	A commenter requested additional detail regarding the historic change in wetlands within the project area.
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NPS Response to Concern Statement 37176:

Additional detail has been provided on historic wetlands at the onshore facility in the “Wetlands and Waters of the U.S.” section in chapter 3 of the Final EIS.

WE2000 - Wetlands and Waters of the U.S.: Impact of Alternatives

Concern Statement 36230	<p>Commenters requested additional detail regarding the impacts of commercial shellfish operations on wetlands, including:</p> <ul style="list-style-type: none"> -additional detail on acreages of impacts (including the acreage of the entire estero for context) -substantiation of adverse impacts of commercial shellfish operations on wetlands -impacts of plastic debris -distance between existing onshore facilities and structures and onshore wetlands -impacts in the context of climate change
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NPS Response to Concern Statement 36230:

Changes to the impacts sections in chapter 4 were included to clarify acreages of the areas used for offshore oyster culture. Acreages are based on permitted beds for the various uses (racks and bottom bags). Data on site specific acreages used, such as the exact square footage of coverage by bags, is ever changing as bags are placed and removed. For comparison of alternatives, the review of impacts is based on the size of the permitted culture beds. With regard to onshore impacts to wetlands, DBOC provided additional information related to a proposed new intake pipe under alternative D. This information has been incorporated into the chapter 4 section. Other aspects of onshore activities related to potential wetland impacts are adequate for comparing alternatives.

There is not a designated buffer at the onshore facilities. Distances between wetlands and structures vary along the shoreline and can be viewed on figure 2-3, which shows existing conditions. In response to one commenter, the wetland impacts section of chapter 4 has been revised to acknowledge the mobile home located on the shoreline of the pond adjacent to the onshore facilities.

The park recognizes the history of loose debris directly attributed to shellfish operations, and the evaluation of alternatives takes into consideration the unavoidable release of plastics that may wash ashore in the future. Debris cleanup is a requirement of sections 3.2.2 and 3.2.3 of the 2007 Cease and Desist Order with the CCC, and section 7(b) of the 2008 SUP, and is the responsibility of DBOC.

A review of mapping was performed to determine the approximate acreage of mudflats, sandflats, and eelgrass within the permitted beds. This information is included in the chapter 3, in the “Wetlands and Waters of the U.S.” section.

The wetlands section of chapter 4 is clear in its analysis that impacts to wetlands from offshore structures and bottom bags are in the context of acreages of the available permitted beds. Because the racks are not expected to change in size during the course of the permit period, the reported figure of 7 acres was used to describe the area of impact based on the dimensions of the racks as fixed structures (NAS 2009). On the other hand, the exact coverage of bags is variable and unpredictable since bags would be routinely moved; thus, the acreage size of the permitted beds was used for the impact analysis. The wetlands section of chapter 4 also states that the analyses are based on physical impacts, or those actions where a structure is placed in a wetland or the wetland is physically altered such as with dredging or filling. Other impacts to wetlands that may occur such as changes in water quality, impacts to vegetation, wetland wildlife habitat, benthics, etc. are discussed in other sections. Discussion of value of infrastructure as artificial habitat is addressed in “Impacts on Wildlife and Wildlife Habitat: Fish” section of chapter 4

Additional detail was provided in chapter 4 to acknowledge impacts to wetlands in the context of climate change.

Concern Statement 36231	Commenters requested additional discussion of relevant laws and policies related to wetlands.
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NPS Response to Concern Statement 36231:

Chapter 4 focuses on impacts to wetlands primarily from three actions: the discharge of fill material, the dredging/excavation in wetlands, and temporary disturbances to wetlands caused by the shellfish operation. The laws and policies presented in the Draft EIS provide context for addressing these actions. Issues related to wildlife habitat or water quality are discussed in other sections. The list of laws and policies for each impact topic in the EIS is intended to present a context in which to evaluate proposed actions. With regard to Nationwide Permit 48, NPS is aware of the promulgated rule changes affecting all Nationwide Permits dated February 1, 2012, as well as California’s changes to their implementation of section 401 Water Quality

Certification. Chapter 4 of the EIS has been updated to include a clearer explanation of the revisions to the NWP 48. It should be noted that the U.S. Army Corps of Engineers is the sole agency responsible for determining whether any shellfish operation project meets or does not meet the NWP 48 requirements.

WI1000 - Wilderness: Affected Environment

<p>Concern Statement 36232</p>	<p>Commenters requested additional detail regarding existing wilderness areas and characteristics, including the following:</p> <ul style="list-style-type: none"> -amount of commercial shellfish operations within wilderness area -designation of non-conforming uses
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NPS Response to Concern Statement 36232:

Please refer to the “Wilderness” section of chapter 3 on pages 262-266 for the amount of commercial shellfish operations that take place within the congressionally designated potential wilderness area and why that use is designated as nonconforming. Onshore facilities are approximately 750 feet north of the boundary of the congressionally designated wilderness area.

WI2000 - Wilderness: Impact of Alternatives

<p>Concern Statement 36233</p>	<p>Commenters requested clarification regarding the impacts on wilderness characteristics, including the following:</p> <ul style="list-style-type: none"> -eligibility for conversion under all alternatives -enhancement of wilderness character -consistency with the Wilderness Act and those acts designating wilderness areas within the Seashore -plastic debris
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NPS Response to Concern Statement 36233:

Eligibility for Conversion. Human use of an area does not per se preclude it from being eligible as a congressionally designated wilderness area. The Wilderness Act provides that wilderness areas are to be administered for the use and enjoyment of the American people as wilderness in a manner that will leave them unimpaired for future generations. Section 4(c) of the Wilderness Act identifies certain activities and uses that are prohibited in wilderness. Included among those restrictions is a prohibition on commercial enterprises. DBOC’s commercial shellfish operation is a commercial enterprise that cannot continue if Drakes Estero is converted to congressionally designated wilderness (page 461).

Issuance of a new 10-year SUP under the authority of section 124 would not change the eligibility of the congressionally designated potential wilderness to be converted to congressionally designated wilderness at a future date; however, the period of time during which impacts are analyzed in this document is 10 years. Therefore, the impacts on wilderness character focus on how continued commercial shellfish operations would continue to impact wilderness characters for the next 10 years, even if wilderness conversion takes place in 2022.

Enhancement of Wilderness Character. Enhancement of wilderness characters is based upon the expectation that the natural and physical resources and processes of Drakes Estero would return to a more natural state, as summarized under the “Impacts to Wilderness” section of chapter 4. Additional detail regarding the impacts on these resources can be found in the respective sections.

Consistency with Wilderness Act. Commercial shellfish operations are the only nonconforming uses currently preventing conversion of Drakes Estero from congressionally designated potential wilderness to congressionally

designated wilderness, as described in the “Impacts on Wilderness” section of chapter 4. The following items do not preclude conversion from potential wilderness to wilderness: the presence of working ranches surrounding Drakes Estero, the public trust right to fish, and the retained rights of the state to minerals.

Plastic Debris. Additional detail was added to the “Impacts on Wilderness” section (pages 464-465, 470) to address how shellfish operation debris impacts wilderness characters.

WQ1000 - Water Quality: Affected Environment

Concern Statement 36234	Commenters requested additional detail regarding the current water quality of Drakes Estero, including the following: -role of shellfish in filtration of water -DBOC's discharge of water into Drakes Estero
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NPS Response to Concern Statement 36234:

The role of bivalves as filter feeders is well documented in the chapter 3 sections on Biochemical Cycling and Bivalves. Additional narrative related to bivalves as filter feeders has been included in the Water Quality section of chapter 4. This section also notes the influences to water quality caused by the cattle ranches as identified in the CDPH’s shellfish harvesting plan for DBOC. No data is available that details the effects the oysters have on runoff entering Drakes Estero.

According to RWQCB, the current discharge from the washing station does not constitute a pollutant and does not require monitoring for compliance with the Clean Water Act. DBOC’s discharge of water into Drakes Estero is recycled water pumped from the estero. Alternatives B, C, and D call for a new sediment basin to allow the filtering of the spray wash before the water is allowed to discharge into the estero.

Concern Statement 37183	Commenters requested that use of specific references related to water quality be reviewed and/or revised.
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NPS Response to Concern Statement 37183:

References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 850 additional references were suggested for use in the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant, including within this section. Please refer to the “Impact Topic: Water Quality” section of chapter 3 for references cited.

Very little peer-reviewed data is available on water quality of Drakes Estero other than the reports by Anima (1990, 1991) in the early 1990s, the pathogenic water quality results reported annually by CDPH, and the limited data collected by Wechsler in 2004. The suggested alterations to the water quality narrative were taken into consideration. The data in the EIS are believed to accurately reflect these earlier studies and reports. The “Impacts on Water Quality” section also has been revised considering the suggestions made by NAS (2012). See pages XXX regarding what data were available and how the data were used.

The statement referencing cattle head numbers was simply a statement of fact to give the reader information that the number of cattle was reported to decline between 1991 and 2005. With regard to pathogenic information, data provided by CDPH’s was utilized and cited.

While the data from sampling is not reported, the EIS focused on the findings of CDPH. Data on pathogenic

sources has been collected over the years through the state’s mandated collection of water samples and shellfish tissue samples. The results of these collections were used to develop a harvesting plan specifically for DBOC. The harvesting plan is modified periodically based on new information as samples are continually analyzed. For instance, the 2012 harvesting plan mentions a new monitoring station near the shoreline where cattle have been observed over a concern about heightened fecal coliform levels in that specific area of Drakes Estero. Overall, the EIS is consistent with the findings and decision-making conclusions of CDPH.

WQ2000 - Water Quality: Impact of Alternatives

<p>Concern Statement 36235</p>	<p>Commenters requested additional detail regarding the impacts of commercial shellfish aquaculture on water quality, including:</p> <ul style="list-style-type: none"> -relative role and scale of tidal flushing in impacting water quality -difference in flushing between the main body of the estero versus the bays -ecosystem services (such as biosequestration, nutrient removal/denitrification, and particulate filtration) provided by commercial shellfish -impervious surfaces -use of treated wood -wastewater treatment -use of water from Drakes Estero and the state of it when returned to Drakes Estero
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NPS Response to Concern Statement 36235:

The comment on tidal flushing does not accurately describe the conditions of Drakes Estero. This system flushes most of its water and receives a new supply of water each tidal cycle. In addition, the nutrient load from the watershed is relatively low because the size of the water shed is comparatively small. With the high flushing rate, the risk of anoxia is extremely low. See pages 210, 212, and 228 of the Final EIS for more details on this discussion.

Beneficial filter feeding functions provided by oysters is described in chapter 3 of the EIS. A similar acknowledgement with references has been provided in the “Impacts on Water Quality” section of chapter 4.

DBOC’s wastewater treatment system at the onshore facility operates via a pumping system that conveys the wastewater to a septic system located on the neighboring ridge. NPS is not aware of any unauthorized discharges or problems with the wastewater treatment system at the onshore facility since the septic system was installed. There was an incident in 2006 when a septic system at one of the ranches failed due to flooding. The park immediately corrected the situation by installing a new system out of the flood-prone area and monitoring the system on a regular basis. Nevertheless, the placement of on-site wastewater treatment facilities near shorelines always has the potential to fail and cause spillage into surface waters. This risk must be considered in the analysis of alternatives.

The water quality monitoring is part of a program required by the California Department of Public Health (CDPH) as cited in chapters 3. Monitoring stations are established by CDPH, and DBOC is required to collect samples for analysis. CDPH uses this data to develop harvesting restrictions as part of a management plan for commercial shellfishing. The locations of the water quality monitoring sites are distributed across Drakes Estero within the permitted shellfish growing area.

The EIS cites benefits of bivalves on water quality in chapters 3 and 4 via removal of nutrients, sediments, and phytoplankton. While the filter feeding benefits of shellfish to water quality and nitrogen/phosphorus uptake is noted, the EIS describes that Drakes Estero obtains the vast majority of its nutrients from oceanic sources each tidal flushing cycle, and excessive contributions of nitrogen and subsequent hypoxia are not concerns with this system.

The California Department of Public Health monitors phytoplankton across the entire coastline of the

state for occurrences of red tide or PSP events. Information regarding diatoms specific to public health are presented in the water quality section in chapter 3.

The topic of impervious surfaces relates to water quality due to surface runoff of pollutants into Drakes Estero during rain events. The EIS makes a comparative analysis between alternatives taking into consideration the removal of impervious surfaces from buildings, etc., as well as the removal of DBOC motorized equipment and personal vehicles that may contribute to non-point sources of pollutants.

Information regarding proposed installation of the work platform, dock, conveyor and sediment basin were included in the EIS based upon information provided by DBOC following the 2011 storm damage event. Description of these activities has been incorporated into the water quality section of chapter 4.

In response to concerns about copper leachates and impacts to salminods, additional review of literature sources and an expanded analysis of the use of treated wood for the racks were performed. DBOC submitted a request in June 2012 to repair/replace 50 racks in 2013 and 25 racks in 2014. This information is included in the chapter 4 water quality section.

Concern Statement 36237	Commenters requested that use of specific references related to water quality be reviewed and/or revised.
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NPS Response to Concern Statement 36237:

Over 850 additional items were suggested during preparation of the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant to this section. Please refer to the “Impacts on Water Quality” section of chapter 4 (pages 423-441) for references used.

The water quality sections in chapters 3 and 4 of the EIS recognize the filtering functions that bivalves provide to water quality. Based on best available data, it has been determined that the primary sources of nutrients in Drakes Estero derive from the Pacific Ocean from tidal exchange. Specific pathogens related to runoff from the watershed have been identified in chapter 3 water quality section as reported by the CDPH.

Anima reported very small levels of pesticides in the bottom sediment of Drakes Estero. The Final EIS notes that these levels are “near or below the detection limits of the analytical methods used.” Nevertheless, they exist, and disturbances to sediment would result in an impact to water quality as these pesticides are reintroduced back into the water column, albeit at very low levels.

CC3000 - Consultation and Coordination: Public Outreach and Involvement

Concern Statement 36239	A commenter stated that the public involvement for this EIS was not done properly and in accordance with CEQ regulations.
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NPS Response to Concern Statement 36239:

Although section 124 provides authority “notwithstanding any other law,” DOI and NPS decided to prepare an EIS and provide for public involvement in this decision.

The NOI that was published in the Federal Register for this project contained the purpose and need for taking action. Although CEQ calls for including potential alternatives, no alternatives existed at the time

the notice was published, and therefore no potential alternatives were included. The scoping process was described in the NOI, including the closing date of the comment period and a web address for additional information. A press release was issued on October 5, 2010 prior to the NOI being published in the Federal Register announcing the dates, times and places of the public scoping meetings. This information was also posted on the PEPC website and the park's website. On October 8, 2010, the NPS sent out letters to interested parties to inform them of the upcoming public scoping opportunities and activated the project on the PEPC web-site (<http://parkplanning.nps.gov/pore>). The NPS confirmed that information in the press release announcing the scoping meetings was picked up by many San Francisco Bay Area media outlets and interested parties were well-informed, as evidenced by the high turnout. NPS has not received any comments from interested parties who were unable to attend the meetings due to insufficient notice.

During the 50-day public scoping period, the NPS made every effort to diligently involve the interested and affected public, including holding three meetings in the vicinity of the park. To the extent that any member of the public or any organization was not included in the initial scoping notices, those that made themselves known to NPS by commenting during scoping or otherwise indicating that they would like to be informed about the process were added to the mailing list for the project. A number of national organizations participated in the planning process, as evident from their comments submitted on the Draft EIS.

In addition, the NPS received a significant amount of correspondence from the public during both the scoping and the Draft EIS comment period. Due to unforeseen reasons (a temporary power failure and the release of the Marine Mammal Commission report), NPS extended both the scoping and Draft EIS comment periods to accommodate those who were unable to comment or had additional comments. Ultimately, NPS received 4,160 pieces of correspondence for scoping, and 52,473 pieces of correspondence on the Draft EIS.

Public participation and outreach throughout the EIS process has been consistent with that required by NEPA and the DOI NEPA regulations, and in fact, provided far more public participation opportunities than the minimum required by NEPA and CEQ.

Concern Statement 36296	A commenter requested that name and contact information be required for anyone submitting comments during the NEPA process and the NPS should not make policy decisions based on public comments from unidentified and unverified individuals.
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NPS Response to Concern Statement 36296:

NEPA does not require identification to be provided or proven as a condition of providing public comments. All public comments received by the NPS in one of the acceptable methods described in the Notice of Availability and posted on the NPS PEPC site and Point Reyes National Seashore website were considered and treated equally. Public comment was only one of many factors considered by the decision maker when selecting the preferred alternative.

RF1000 – Suggested References

Concern Statement 36244	Commenters suggested additional references for use.
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NPS Response to Concern Statement 36244:

All references suggested by public comment as well as the peer reviews of the Draft EIS have been reviewed. Over 850 references were suggested for consideration in the Final EIS. References that were not applicable (i.e., not within Drakes Estero or for research conducted in a dissimilar setting) or did not meet the criteria described under “References Used for Impact Analysis” on page 23 of the Final EIS were not used in preparing the Final EIS. Over 150 references were closely reviewed, considered for use, and are incorporated where relevant to this section.

G

**SUMMARY OF RESPONSES TO THE
NAS REVIEW OF THE DRAFT EIS**

SUMMARY OF RESPONSES TO THE NAS REVIEW OF THE DRAFT EIS

The National Park Service (NPS) response to each of the “NAS [National Academy of Sciences] Suggestions for DEIS [Draft Environmental Impact Statement] Revisions and Reducing Uncertainty in the Conclusions” is provided below.

- 1. NAS Suggestion: Re-define levels of impact intensity using criteria that clearly distinguish levels of impact (negligible, minor, moderate and major) that are comparable across levels (e.g., direct and indirect impacts; impacts at individual, population and community levels of organization).**

NPS Response: Intensity definitions are intended to make a predicted level of impact easier for the public and decision-maker to understand. Per the NPS Director’s Order 12 Handbook (NPS 2001b), the use of intensity definitions such as negligible, minor, moderate or major, is optional.

In response to this suggestion, NPS made the following changes to impact intensities. The intensity definitions for wildlife and wildlife habitat were revised so that impacts across levels of organization are consistently described. Specific concerns from the committee regarding intensity definitions for special-status species, coastal flood zones, water quality, and soundscapes were considered and the definitions clarified as necessary. The intensity definitions were also revised to describe the context (geographic scale) consistently amongst the various levels of impact. Direct and indirect impacts are described independently of the intensity definitions, as is the standard practice in a NPS National Environmental Policy Act (NEPA) document.

Although not required by NPS NEPA guidance (DO-12 or DO-12 Handbook), the definition of negligible was added for each impact topic. The category of “negligible” impact is most appropriately used to discuss those impact topics considered but dismissed from further analysis in chapter 1.

The NAS also questioned why the Draft EIS did not have magnitude thresholds for beneficial impacts. The Council on Environmental Quality (CEQ) regulations (40 CFR 1508.8) define the effects analyzed in an EIS to include “those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.” The primary purpose of this reference to beneficial effects is thus to ensure that detrimental impacts are not hidden or ignored based on an argument that the net effects of an action might be beneficial. Neither these definitions nor anything else in the CEQ regulations or NPS NEPA guidance creates any requirement to assign impact intensity scales to “beneficial impacts.”

The CEQ regulations advise (40 CFR 1500.2), and the NPS *Management Policies 2006* (NPS 2006) require, that managers minimize and avoid adverse impacts to park resources. Standard NPS NEPA practice, as reflected in the Director’s Order 12 Handbook (NPS 2001b) and elsewhere, thus focuses mainly on describing and disclosing adverse effects. Beneficial effects may be discussed and analyzed, wherever present, but generally only in a qualitative manner. Developing intensity definitions for such effects is generally not necessary given their limited role in the analysis. Generating “beneficial impact” intensity definitions, especially given that it would be neither required nor standard practice under NEPA, was not warranted.

2. NAS Suggestion: Qualify each impact intensity conclusion in terms of levels of uncertainty such as those used by the committee.

NPS Response: Uncertainty levels are not used within the impact analyses; however, a discussion on the strength of the underlying scientific data was added to the methodology section for each impact topic that specifically discusses the data and information used for impact analysis. For each impact topic, the methodology clearly indicates what data/information is used in assessing impacts, where that data/information came from (research on Drakes Estero or other similar ecosystems), and what data/information is lacking.

3. NAS Suggestion: Clearly identify and explain all assumptions made in reaching conclusions concerning impact intensities.

NPS Response: The impact analysis was reviewed and revised where necessary to ensure it is clear to the reader why a particular impact intensity level is assigned. Assumptions used for impact analysis are described at the beginning of chapter 4 as well as under the “Methodology” section for each impact topic.

4. NAS Suggestion: Describe potential alternate conclusions as appropriate (e.g., Table 5-2).

NPS Response: Comments from chapter 3 of the NAS report specific to each resource were reviewed and changes were made to the analysis as needed. The revised impact analysis was then compared to the revised intensity definitions and, based on best professional judgment, an impact level was assigned.

It is important to note that many of the committee’s alternate conclusions consider the context, or geographic extent of the impact, when suggesting a lower level of impact intensity. (e.g., “Impact may be minor given the local scale of the DBOC [Drakes Bay Oyster Company] footprint.”) Intensity definitions have been clarified to include a consistent description of context within each impact level.

In addition, see the response to NAS Suggestion #2.

5. NAS Suggestion: Segregate impact assessments for alternative A from alternatives B, C, and D and indicate that the assessments are not comparable due to use of different baselines.

NPS Response: This suggestion from NAS is tied to the NEPA concept of the “no action alternative.” As the NAS explained, “The committee recognizes that, in NEPA practice, the ‘no action’ alternative is usually considered the ‘baseline’ under which current environmental conditions are compared. In these situations, environmental conditions would not change under a ‘no action’ alternative. However, in the case of DBOC, if the Secretary of the Interior took no action, the Special Use Permit (SUP) would expire and alternative A would be implemented, which would change current conditions” (NAS 2012a). NPS agrees with NAS that if the Secretary takes no action, DBOC’s authorizations would expire and existing conditions would change. (For further explanation of the NPS’s approach to the no-action alternative, see Response to Concern Statement 35987 in appendix F.) As a result, the usual approach to the no-action alternative (i.e., continuation of current conditions) was not appropriate here.

Given the uniqueness of this situation, the Draft EIS included expressions such as “would continue to occur” when describing impacts under alternatives B, C, and D to reinforce the fact that the impacts described are not new impacts, rather they are existing impacts that would persist into the future. This emphasizes that the impacts being described in each of the action alternatives are grounded in the existing conditions, which are described in “Chapter 3 Affected Environment” of the EIS. Additional clarifying language has been added throughout the impact analysis where appropriate to note where an impact would continue versus what would constitute a new impact.

6. NAS Suggestion: Use all relevant and available information, especially for water quality and soundscapes, such as additional measurements reported in Volpe (2011); analyze sound levels based on both dBA and unweighted values across a wide frequency range; and consider duty cycles when estimating the fraction of time DBOC activities impact the soundscape.

NPS Response: Additional relevant and available information has been considered when revising the water quality and soundscapes impact analyses in the Final EIS. Studies on water quality related to commercial shellfish operations have been performed worldwide in a vast array of aquatic regimes. The assessment in the Final EIS relies on data specific to the immediate project area, and inferences based on offsite studies in similar environments were used as supporting information. Onsite studies include the work over decades by the California Department of Public Health (CDPH) regarding harmful bacteria and toxic algae, water quality reporting by Anima from the early 1990s (1990, 1991), and Wechsler’s work (2004) measuring nutrients and turbidity levels from 2003. NAS suggested the use of preliminary poster abstracts, some of which were released well after public release of the Draft EIS, without a full review of methods and data. These abstracts do not meet the criteria for primary reference works described in the “References Used for Impact Analysis” section of the EIS; therefore, they have not been incorporated into the Final EIS. Because shellfish are filter feeders, it was important as part of this assessment to look at the onsite studies to evaluate the influences, if any, DBOC shellfish may have on water quality. In this regard, the only data at Drakes Estero that compares water quality parameters in Schooner Bay (commercial shellfish operations) and in Estero de Limantour (no commercial shellfish operations) were collected by Wechsler (2004). This data was used in the analysis of impacts on water quality. Offsite studies were used where onsite data gaps existed.

To supplement the soundscapes section in the Final EIS, the data collected onsite by Environ International Corporation has been included in the existing conditions and analysis of impacts. Because Environ did not follow pertinent standards and because the measurement processes and the operating conditions of the equipment were not adequately described, the Environ measurements were compared with reports that document noise levels measured under specified conditions from comparable equipment. In addition, measurements of boat noise made at the PORE004 site during the Volpe (2011) study and calculated from six microphone-to-boat distance measurements (Goodman 2012) have been included in the existing conditions documentation and as part of the impact analysis. Chapter 3 text has been expanded to discuss comparative audiological studies that suggest human hearing is a protective model for most terrestrial wildlife when evaluating low frequency noise impacts. Very few terrestrial vertebrates have lower hearing thresholds than humans below 500 Hz. Flat weighting, as suggested by the NAS committee, ignores the universal trend of diminished hearing sensitivity at low and high frequencies by all terrestrial vertebrates. Finally, additional analysis of the PORE004 data (as collected during the Volpe 2011 study) has been used to document the temporal extent of impacts and the distribution of noise levels within the reception

range of microphone PORE004 at this location, and language has been added to explain why these measures understate noise exposure in most other parts of Drakes Estero.

7. NAS Suggestion: Additional mitigation options could be included as possible permit conditions for the action alternatives to reduce impacts, e.g., an option to cease the culture of Manila clams would address some concerns about the establishment of that non-indigenous species in Drakes Estero; impacts of many DBOC practices (i.e., boat use, culture species and techniques, marine debris, soundscape effects) could potentially be reduced by the implementation of appropriate mitigation measures.

NPS Response: Section 124 provides the Secretary the discretionary authority to issue a Special Use Permit (SUP) with the same terms and conditions as the existing authorizations. All of the special permit conditions from sections 4 and 6 of the 2008 SUP were included as elements common to all action alternatives.

As a result of NAS recommendations, Manila clams have been removed as a species authorized for cultivation under alternative C to address concerns about the establishment of this invasive species in Drakes Estero. Although Manila clams are presently cultivated in and harvested from Area 1, a SUP granted under this alternative would not allow cultivation and harvest of Manila clams. While Manila clams were permitted in Area 2 in 2008 when the SUP was signed, the bottom bag culture method used at the time was not consistent with authorized methods for that permit. Should this alternative be selected, DBOC would be required to remove all Manila clams currently being cultivated in Drakes Estero prior to receipt of a new SUP. DBOC would also be responsible for implementing culture handling and harvest practices to minimize fragmentation and loss of *Didemnum* from oysters within Drakes Estero. In addition, under alternative D, DBOC would be required to house onshore sound-generating equipment within any new buildings constructed to the extent practicable. Additional mitigation measures have not been added to the action alternatives due to the uncertain nature of their technical, operational, or economic feasibility. However, if further investigation into these potential mitigation measures indicates that they are in fact feasible, additional mitigation measures may be included as permit conditions in the future.

Other measures identified within the Final EIS include removal of European flat oyster and prohibition of stake culture methods from all of the action alternatives.

In addition, section 2(b) of the 2008 SUP establishes that DBOC is responsible for obtaining all necessary permits, approvals, or other authorizations relating to use and occupancy of the premises.

8. NAS Suggestion: Assess impacts associated with the potential establishment of non-indigenous species as a separate category.

NPS Response: In determining impact topics, the NPS considers all natural, cultural, and human resources that may be affected by the proposed action. It is not standard practice to consider “the potential establishment of non-indigenous [nonnative] species” as a stand-alone impact topic, but instead to consider the impact these species may have on the natural, cultural, or human environment, as appropriate. Within the EIS, the impact of each alternative on the potential establishment, spread, or

reduction of nonnative, invasive species is considered in the following resources: wetlands, eelgrass, wildlife and wildlife habitat: benthic fauna, wilderness, and NPS operations.

- 9. NAS Suggestion: Provide greater consideration of the potential influence of climate change on DBOC operations and their associated impacts, e.g., rising sea level over the next 10 years could influence the spatial extent of inundation, potentially impacting resource categories such as vegetated tidal wetlands and the coastal flood zone (NRC, 2012); geographic ranges of warm water marine species are already extending poleward (e.g., Sorte et al., 2010; Doney et al., 2012), a trend that could exacerbate problems associated with invasive non-indigenous species, including increasing the potential for establishment of reproductive populations of the nonnative Pacific oyster in Drakes Estero.**

NPS Response: Additional discussion of climate change impacts on wetlands, coastal flood zones, and implications of climate change on the spread of invasive species has been incorporated into the EIS based upon information from scientific literature to the extent possible.

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H

WECHSLER DATA

WECHSLER DATA

The following tables are taken from the Wechsler (2004) report, *Assessing the Relationship Between the Ichthyofauna and Oyster Mariculture in a Shallow Coastal Embayment, Drakes Estero, Point Reyes National Seashore*.

TABLE H-1. ENVIRONMENTAL CHARACTERISTICS MEASURED IN ESTERO DE LIMANTOUR AND SCHOONER BAY DURING THE DRAKES ESTERO ICHTHYOFAUNA-OYSTER MARICULTURE STUDY, DRAKES ESTERO, POINT REYES NATIONAL SEASHORE, 2002-2004

Date	Location	Depth (m)	Salinity (ppt)	Temp (C)	Clarity (m)	DO (mg/l)	DO (%)
12/4/02	Limantour	2.10	32.7	13.3	2.10*	7.33	85.0
12/4/02	Limantour	1.67	32.7	12.5	1.67*	6.35	74.6
4/14/03	Limantour	1.55	32.2	13.5	1.55*	7.79	89.4
4/14/03	Limantour	0.65	32.5	13.9	0.65*	9.01	106.2
4/14/03	Limantour	1.50	32.0	14.7	1.50*	7.23	86.5
4/14/03	Limantour	1.10	32.7	12.8	1.10*	8.94	103.4
7/1/03	Limantour	0.97	32.6	19.5	0.61	13.27	176.0
7/1/03	Limantour	1.73	32.3	15.0	1.28	10.43	125.3
7/27/03	Limantour	2.00	33.0	18.7	2.00*	9.50	124.5
10/17/03	Limantour	2.07	33.7	11.7	2.07*	7.80	88.0
10/17/03	Limantour	1.46	33.9	13.5	1.46*	9.71	115.3
10/17/03	Limantour	2.59	33.9	12.7	2.59*	8.16	96.5
11/14/03	Limantour	†	32.5	12.2	†	6.82	77.8
11/14/03	Limantour	2.10	32.7	12.5	2.01*	7.68	88.5
11/14/03	Limantour	1.34	32.4	12.5	1.34*	8.02	92.4
1/12/04	Limantour	1.44	29.8	12.0	1.44*	8.45	93.2
1/12/04	Limantour	1.30	28.7	12.1	1.30*	8.47	94.4
	Mean	1.60	32.37	13.71	1.54	8.53	101.00
12/3/02	Adjacent to Racks	2.30	32.8	12.0	2.30*	9.50	†
4/11/03	Adjacent to Racks	2.10	34.0	15.7	1.75	8.44	104.0
4/14/03	Adjacent to Racks	†	32.8	13.2	†	7.36	86.4
4/14/03	Adjacent to Racks	1.45	32.7	14.3	1.45*	8.44	100.8
6/28/03	Adjacent to Racks	1.60	32.3	18.9	1.07	13.75	140.5
7/24/03	Adjacent to Racks	1.60	34.6	19.4	6.70	6.70	89.5
7/25/03	Adjacent to Racks	1.65	34.3	20.6	1.65*	10.31	140.0
10/18/03	Adjacent to Racks	1.25	33.9	13.4	1.25*	8.07	95.5
11/12/03	Adjacent to Racks	1.92	31.6	12.8	1.92*	7.88	91.1
11/12/03	Adjacent to Racks	1.86	31.8	12.8	1.86*	8.51	98.3
11/12/03	Adjacent to Racks	2.01	31.7	12.3	1.71	7.43	84.7
1/10/04	Adjacent to Racks	1.98	28.9	12.2	1.14	7.71	86.2
1/10/04	Adjacent to Racks	1.52	29.3	13.1	0.83	8.67	98.2
	Mean	1.68	32.00	14.18	1.83	8.43	99.76

Source: Wechsler 2004

* Starred clarity data indicates those readings truncated by the same distance equal the bottom.

† Data not recorded.

Note: Clarity recorded adjacent to racks on 7/24/03 appears to be incorrect, as it exceeds the depth of the bottom.

TABLE H-1. ENVIRONMENTAL CHARACTERISTICS MEASURED IN ESTERO DE LIMANTOUR AND SCHOONER BAY DURING THE DRAKES ESTERO ICHTHYOFAUNA-OYSTER MARICULTURE STUDY, DRAKES ESTERO, POINT REYES NATIONAL SEASHORE, 2002-2004 (CONTINUED)

Date	Location	Depth (m)	Salinity (ppt)	Temp (C)	Clarity (m)	DO (mg/l)	DO (%)
4/11/03	Away From Racks	1.05	33.5	18.1	1.05*	11.08	143.0
4/14/03	Away From Racks	1.45	32.4	12.5	1.45*	7.33	84.4
6/29/03	Away From Racks	1.58	32.8	30.6	0.97	8.75	117.5
7/24/03	Away From Racks	1.50	31.5	15.7	1.50*	11.31	139.0
10/18/03	Away From Racks	1.58	34.2	15.4	1.58*	7.84	96.0
10/18/03	Away From Racks	1.83	33.8	14.6	1.83*	9.80	118.3
11/12/03	Away From Racks	1.52	31.6	12.8	1.52*	7.98	92.0
11/12/03	Away From Racks	1.55	31.8	12.8	1.55*	8.90	102.8
11/12/03	Away From Racks	2.07	31.4	12.5	1.46	7.31	82.5
1/10/04	Away From Racks	2.38	27.9	12.4	0.91	8.66	93.8
1/10/04	Away From Racks	1.88	23.5	12.3	0.45	8.74	92.0
	Mean	1.73	31.16	13.95	1.39	8.61	101.15

Source: Wechsler 2004

* Starred clarity data indicates those readings truncated by the same distance equal the bottom.

† Data not recorded.

Note: Clarity recorded adjacent to racks on 7/24/03 appears to be incorrect, as it exceeds the depth of the bottom.

TABLE H-2. WATER COLUMN VARIABLES MEASURED DURING THE DRAKES ESTERO ICHTHYOFAUNA-OYSTER MARICULTURE STUDY, POINT REYES NATIONAL SEASHORE, DECEMBER 2002 – JANUARY 2004

Date	Location	Ammonia (NH ₄ -N)	Nitrate (NO ₃ -N)	Total Suspended Solids
April	Limantour	0.13	0.050	112.00
April	Limantour	0.11	0.170	84.00
April	Limantour	0.12	0.050	86.00
April	Limantour	0.16	0.050	110.00
July	Limantour	0.18	0.050	62.00
July	Limantour	0.21	0.050	56.00
July	Limantour	0.21	0.050	94.00
	Mean	0.16	0.07	86.29
April	Schooner Adjacent to Racks	0.13	0.060	104.00
April	Schooner Adjacent to Racks	0.14	0.080	98.00
April	Schooner Adjacent to Racks	0.12	0.050	108.00
July	Schooner Adjacent to Racks	0.20	0.050	96.00
July	Schooner Adjacent to Racks	0.14	0.050	94.00
July	Schooner Adjacent to Racks	0.38	0.050	72.00
	Mean	0.19	0.06	95.33
April	Schooner Away from Racks	0.12	0.050	112.00
April	Schooner Away from Racks	0.12	0.050	82.00
April	Schooner Away from Racks	0.21	0.050	116.00
July	Schooner Away from Racks	0.25	0.050	58.00
July	Schooner Away from Racks	0.21	0.050	72.00
July	Schooner Away from Racks	0.12	0.050	70.00
	Mean	0.17	0.050	85.00

Source: Wechsler 2004

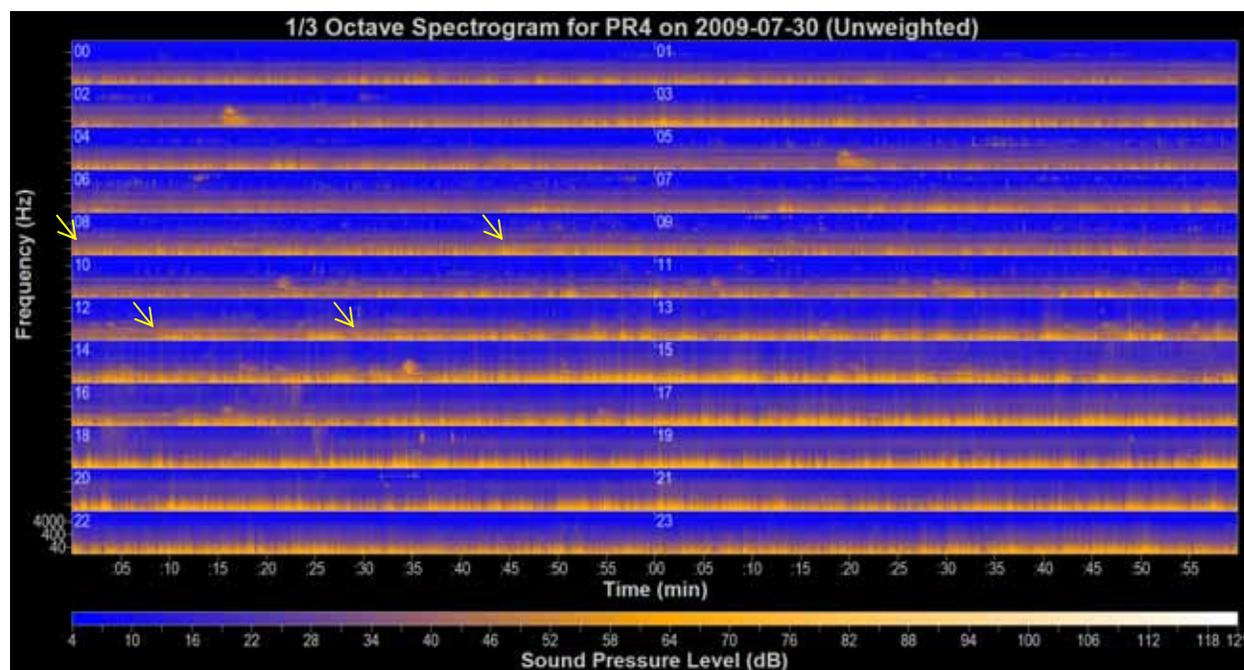
SUPPORTING SOUNDSCAPE-RELATED DATA

SUPPORTING SOUNDSCAPE-RELATED DATA

The John A. Volpe Transportation Center (Volpe) conducted an acoustical study at Point Reyes National Seashore in 2009-2010 to support air tour management plan for the park (Volpe 2011). One of four measurement sites – PORE004 – was located at a bluff on the eastern shore of Drakes Estero, to characterize acoustical conditions in the wetlands that compose approximately one third of the park. This site was on the periphery of DBOC operations, approximately 60 yards from the shoreline and more than 2 miles from the DBOC buildings. High bluffs block the direct line from PORE004 to the DBOC processing facilities; the buildings are not in view, and the direct path for noise is blocked by terrain.

The PORE004 site was not in an ideal location for measuring DBOC boat noise; it was far away from routes that DBOC uses regularly and not placed close to the shore. The Volpe analysis did not focus on quantifying boat noise. NPS comprehensively reanalyzed the PORE004 data to identify all noise events that might be associated with DBOC operations and measured the events that could be unambiguously identified as boat noise. Noise events were detected as visible events in spectrographic images generated from the data. Experienced researchers listened to each event using headphones to confirm the identity of the noise source. For example, in the following spectrogram, boat noise events were identified at 0801, 0845, 1209, and 1228 (faint horizontal lines near the tips of the arrows).

FIGURE I-1. 24-HOUR, ONE-THIRD OCTAVE SPECTROGRAM FOR PORE004 DATA ON JULY 30, 2007



Note: Yellow arrows indicate instances of motorboat noise. These arrows are superimposed over raw data collected for the Volpe 2011 study. This spectrogram displays 24 hours of one-second, 1/3rd octave sound level measurements, with two hours presented in each row. The frequency axis within each row is logarithmic, due to the 1/3rd octave structure of the data; the frequency limits are 12.5 Hz to 20 kHz. The color scaling is also logarithmic, expressed in decibels (dB).

Recordings were available for 28 days during the summer measurements, and 112 boat noise events were identified within the reception range of microphone PORE004. On average, PORE004 recorded four

events per day, each of which was audible for an average of 309 seconds, for a total of 20 minutes 36 seconds of boat noise per day. Recordings were available for 23 days in winter, and 80 events were identified within the reception range of microphone PORE004. On average, PORE004 recorded 3.5 events per day, with an average duration of 355 seconds each, for a total of 20 minutes 42 seconds per day. Additional noise events were detected – some of which may not be due to DBOC boat operations – that added more than 90 minutes per day in the summer and 20 minutes 20 seconds in the winter. Table I-1 presents a list of cumulative noise within the reception range of microphone PORE004 for each day that was analyzed as well as minutes of boat noise detected.

TABLE I-1. BOAT NOISE OBSERVATIONS AS EXTRACTED FROM DATA RECORDED BY PORE004

Date	Minutes of Boat Noise	Minutes of Noise*	Day of the Week	Comment	Date	Minutes of Boat Noise	Minutes of Noise*	Day of the Week	Comment
7/17/2009	2.33	2.33	Fri	<7 hours data	8/14/2009	--	--	Fri	too windy
7/18/2009	33.15	41.55	Sat	S, NW wind	8/15/2009	2.68	109.68	Sat	<19 hours data
7/19/2009	22.43	22.43	Sun	S, NW wind	1/9/2010	0.00	34.03	Sat	<11 hours data
7/20/2009	4.88	4.88	Mon	NW wind	1/10/2010	0.00	36.02	Sun	E wind
7/21/2009	3.95	3.95	Tue	NW wind	1/11/2010	0.00	43.90	Mon	E, SE wind
7/22/2009	0.92	0.92	Wed	NW wind	1/12/2010	0.00	0.30	Tue	SE wind
7/23/2009	26.28	86.10	Thu	W, NW wind	1/13/2010	36.75	38.08	Wed	SW, W wind
7/24/2009	40.45	57.50	Fri	W, NW wind	1/14/2010	73.02	90.15	Thu	Variable wind
7/25/2009	1.80	1.80	Sat	S, NW wind	1/15/2010	43.92	153.92	Fri	E wind
7/26/2009	19.23	79.95	Sun	S, NW wind	1/16/2010	0.00	51.30	Sat	E, SE wind
7/27/2009	12.63	12.63	Mon	S, NW wind	1/17/2010	0.00	4.45	Sun	S, SE wind
7/28/2009	22.87	160.67	Tue	W wind	1/18/2010	0.00	2.50	Mon	S, SE wind
7/29/2009	11.28	145.78	Wed	S, W wind	1/19/2010	4.03	11.22	Tue	S, SE wind
7/30/2009	61.92	127.85	Thu	W, NW wind	1/20/2010	0.00	2.40	Wed	S, SE wind
7/31/2009	26.27	58.47	Fri	NW wind	1/21/2010	--	--	Thu	no data
8/1/2009	38.97	74.93	Sat	W, NW wind	1/22/2010	--	--	Fri	no data
8/2/2009	84.77	170.22	Sun	W, NW wind	1/23/2010	0.00	--	Sat	8 hours data
8/3/2009	12.17	267.72	Mon	NW wind	1/26/2010	6.47	9.38	Sun	E, NE wind
8/4/2009	31.20	505.37	Tue	S, NW wind	1/27/2010	160.30	160.30	Wed	W, NW wind
8/5/2009	23.18	113.62	Wed	W, NW wind	1/28/2010	91.57	91.57	Thu	Variable wind
8/6/2009	19.27	177.25	Thu	W wind	1/29/2010	13.65	71.85	Fri	E, SE wind
8/7/2009	0.00	2.18	Fri	NW wind	1/30/2010	21.25	21.25	Sat	Variable wind
8/8/2009	0.00	385.38	Sat	S, NW wind	1/31/2010	0.00	5.25	Sun	Variable wind
8/9/2009	42.38	197.18	Sun	NW wind	2/1/2010	8.98	8.98	Mon	E, SE wind
8/10/2009	0.00	242.78	Mon	S wind	2/2/2010	20.02	20.02	Tue	E, SE wind
8/11/2009	8.05	21.58	Tue	S, NW wind	2/3/2010	5.25	50.20	Wed	E, SE wind
8/12/2009	6.93	6.93	Wed	NW wind	2/4/2010	--	--	Thu	too windy
8/13/2009	--	--	Thu	too windy	2/5/2010	0.00	45.12	Fri	E, SE wind

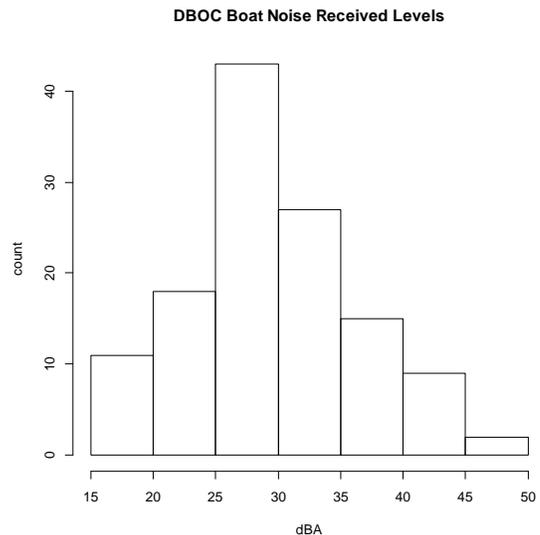
* The aggregate noise figure excludes aircraft and terrestrial vehicular traffic, but it may include some noise sources that are not associated with DBOC operations.
Note: No data is available for January 24-25, 2010 due to the system being offline or malfunctioning.

An impact is considered major in the impact analysis of this EIS if human-caused noise impacts the soundscape for more than 10 percent of a 24-hour day, or 144 minutes. Boat noise within the reception range of PORE004 exceeded this value at PORE004 on one winter day (January 27, 2010); aggregate

noise exceeded this value on eleven days. The PORE004 site was on the periphery of DBOC operations, and the boat noise events reflect boats that were close enough to be heard and unambiguously recognized. Noise tends to refract away from the ground when it travels upwind, so winds from the South, Southeast, and Southwest would be unfavorable for the detection of DBOC boat noise at PORE004.

The peripheral location of the PORE004 site meant that a small fraction of DBOC operations were close to this system, so received levels of the noise were very low. In order to measure the noise levels, NPS marked the unambiguous boat noise events and noise-free intervals that preceded and followed these events for comparison. Received noise levels were calculated by averaging the sound energy within the event, and subtracting out the average energy from noise-free periods on either side of each event that was presumed to represent the background levels. This analysis was restricted to boat noise events that were not overlapped by other noise sources. A total of 169 events met these criteria, of which 125 had sufficient difference between boat and background sound levels to provide a measure of level. A histogram of the boat noise received levels at PORE004 shows that only 24 percent of the boat noise events equaled or exceeded the summer daytime L_{50} level of 34 dBA. There are two reasons why these sounds were audible at PORE004 in spite of their low levels. First, background levels measured on either side of each noise event could have been lower than 34 dBA. Second, previous studies have established that many noises can be audible when the noise dBA value is less than the ambient dBA value (Miller et al. 2003).

FIGURE I-2. DBOC BOAT NOISE RECEIVED LEVELS



Although very little information has been made available regarding the location and activities of DBOC boats, data regarding DBOC boat position and speed were recently presented to the Department for six noise events (Goodman 2012). This additional information can be used to estimate the noise output of the boat as it would have been measured at 50 feet during these events. Spherical spreading loss is the primary factor that decreases noise level with distance, accounting for -20 dB for every 10-fold increase in distance. Atmospheric absorption can be significant at long range, and it varies with frequency and weather conditions. DBOC boats were assumed to have a peak noise level in the 250 Hz $1/3^{\text{rd}}$ octave band, based on data from similar boats measured by Menge et al. 2002 (Figure 34). Climatological averages of 65 degrees F and 81 percent relative humidity from a nearby weather station were used to calculate absorption at 250 Hz using ISO 9613-1 procedures. The resulting absorption coefficient was about -1.7 dBA per mile. The factor in these calculations was the ground effect. Following procedures in ISO 9613-2, the ground effect loss was calculated as -3 dBA for the distant event, and -4 dBA for the five close events. These calculations neglected any losses due to terrain shielding or diffraction of noise at the edge of the bluff between PORE004 and the shoreline. Table I-2 exhibits these calculations for the six noise events

TABLE I-2. CALCULATION OF NOISE EVENTS ON JANUARY 14, JANUARY 15, AND FEBRUARY 2, 2010

Channel	Date	Time	Distance (feet)	Speed (mph)	Event Duration (seconds)	Event L_{eq} (dBA)	Event L_{max} (dBA)	Spreading Loss (dBA)	Absorption Loss (dBA)	Estimated Source L_{eq} (dBA @ 50 feet)	Estimated Source L_{max} (dBA @ 50 feet)
west	1/14/2010	7:31:50	3182	13	518	38.6	43.4	35.4	0.9	78.9	82.9
main	1/14/2010	13:51:34	580	18	138	45.0	47.6	21.3	0.2	70.5	73.1
main	1/14/2010	13:55:44	520	6	178	41.6	50.3	20.3	0.2	66.1	74.8
main	1/15/2010	10:48:00	488	13	482	40.2	51.8	19.8	0.1	64.1	75.7
main	1/29/2010	11:30:00	580	16	283	41.6	59.6	21.3	0.2	67.1	85.1
main	2/2/2010	13:40:00	437	13	1201	34.1	48.7	18.8	0.1	57.1	71.7

Values for estimated average source level (L_{eq}) as well as the peak source level (L_{max}) are provided to offer lower and upper bounds on the reference boat noise level used to model the spatial extent of boat noise in chapter 4. L_{eq} discounts the noise level due to periods of idling and otherwise reduced noise output during noise events. The difference between the L_{eq} and L_{max} estimates is greatest for the longest noise event, which spanned 20 minutes and included several periods when the engine was idling.

The most distant noise event yielded the highest source level. This could be due to an anomalously loud operational condition for the distant event, more efficient transmission of noise downwind (due to refraction), or the unaccounted effects of the bluff on the closer noise events.

REFERENCES

References used in this appendix but not the in main body of the Final EIS are as follows:

Miller, N. P., Anderson, G. S., Hornojeff, R. D., Menge, C. W., Ross, J. C., Newmark, M.
2003 *Aircraft Noise Model Validation Study*. HMMH Report 295860.29, Burlington, MA.