Proper field management of caneberry crops can also substantially reduce risk of LBAM infestation. Most overwintering tortricid larvae survive in surrounding weeds or in trash on and beneath the canes, so these should be removed or disced into the ground. For more information on managing leafrollers in caneberries, see the *UC IPM Pest Management Guidelines: Caneberries* (http://www.ipm.ucdavis.edu/PMG/).

If you find eggs or larvae that you suspect might be LBAM, contact the local local agricultural commissioner.

POSSIBLE IMPACT ON VINEYARDS

Presently in California two tortricid leafrollers may appear as pests in vineyards. Orange tortrix is common in coastal vineyards, and the omnivorous leafroller is found in hot inland valleys, but may also be present in warmer coastal areas. If established, LBAM would probably cause damage similar to that of these two leafrollers. In its native range, LBAM does not do well at high temperatures but thrives in cooler areas with mild summers. Depending on the climatic conditions, LBAM may have from 2 to 4 generations a year.

As with other leafrollers, feeding damage to the buds may occasionally be caused by the overwintering larvae. In the spring, feeding on developing bunches may cause extensive loss of flowers or newly set berries. In the summer, damage is caused by LBAM larvae entering bunches and feeding along the bunch stem and on the berries. Damage to developing and ripening bunches can increase the incidence of Botrytis bunch rot.

As with other leafroller pests on grapevines (see *UC IPM Pest Management Guidelines: Grape* at http://www.ipm.ucdavis.edu/PMG/), there are a number of control strategies available for LBAM management. An important method for reducing overwintering populations is to remove broadleaf weeds and cluster mummies when pruning, then place them in row middles and disc them into the ground.

The effect of natural enemies on LBAM in California is presently unknown. Leafrollers are controlled by several predators such as lacewings, spiders, minute pirate bugs, damsel bugs, and bigeyed bugs, and by several parasitic wasps. Since predators are generalists, they will feed on LBAM. Studies will be needed to determine if the parasitoids that attack native leafrollers may shift to parasitize LBAM.

If insecticide treatment is necessary, then applications can be timed by monitoring flights with pheromone traps, tracking seasonal development with a degree-day model, and field monitoring. There are several reduced-risk insecticides available for control of LBAM. Spraying is most effective after eggs have hatched, but before caterpillars build feeding shelters. It is important to control larvae early in the season before bunch closure. Insect growth regulators are registered for the control of leafrollers in grapevines. *Bacillus thuringiensis* and a formulation of spinosad are approved for use on organically certified grapes.

If a suspected LBAM caterpillar is found, collect it and the webbed leaves or fruit where it is feeding and take the sample to the local agricultural commissioner.

If LBAM becomes established in California, production costs will increase due to additional monitoring (traps and scouting) needed for this pest and control measures in those regions where climate conditions favor LBAM.

POSSIBLE IMPACT ON TREE CROPS

Stone Fruits. Stone fruits in California are attacked by a variety of leafroller species including the fruittree leafroller, obliquebanded leafroller, and omnivorous leafroller. LBAM is damaging to stone fruits grown in warmer areas of Australia, but it cannot be predicted how serious it may become on stone fruits in California. Because many of California's stone fruits already must meet international shipping standards, LBAM is not likely to add significant hardships to growers who presently manage the other leafrollers and species such as the oriental fruit moth and peach twig borer in their orchards.

Parasitoids such as *Macrocentrus* spp., *Cotesia* (*Apanteles*) spp., and *Exochus* spp. commonly attack leafroller larvae, and predators such as lacewings, assassin bugs, minute pirate bugs attack the eggs and larvae. The presence of LBAM in orchards will probably provide an additional food source for these natural enemies.

Follow the monitoring recommendations for leafrollers in the *UC IPM Pest Management Guidelines* for stone fruits. Monitoring for leafroller activity in early spring is very important because many available control materials are most effective on young larvae.

Management programs are already in place for the common leafrollers, and the recommended reduced-risk insecticides (e.g., spinosad, insect growth regulators, and Bt) are also recommended for LBAM suppression. Application of chlorpyrifos is limited to dormant and delayed-dormant periods in stone fruit crops, and other alternatives are available (narrow range oil, esfenvalerate) that may have lesser environmental impacts than chlorpyrifos. For more information on managing leafrollers in stone fruits, see the *UC IPM Pest Management Guidelines* at http://www.ipm.ucdavis.edu/PMG/ for stone fruit crops.

If a suspected LBAM caterpillar is found, collect it and the webbed leaves or fruit where it is feeding and take the sample to the local agricultural commissioner.

Pome Fruits. Pome fruits are attacked by several types of leafrollers including fruittree leafroller, obliquebanded leafroller, apple pandemis, and orange tortrix. As its name implies, LBAM is an important pest of apples and pears. The primary concern is the trade restrictions imposed by importing countries. If LBAM is found in pome fruit-producing counties, the inability to export fruit to some countries may cause severe economic hardship to the industry. Also, feeding damage to the fruit may reach economic levels.

Leafroller larvae cause superficial injury to the fruit surface and may cause extensive damage when feeding in between the fruit in a cluster. Sometimes the larvae burrow into the fruit around the stem. Small larvae may enter the fruit through the calyx or cause "stings" on the fruit surface.

Follow the monitoring procedures for leafrollers given in the *UC IPM Pest Management Guidelines* for apple and pear. Watch for leafroller egg masses and signs of leafroller activity when monitoring orchards. Look for leaves webbed together and leaves webbed against fruit.

The management of LBAM is similar to the control of other leafrollers of pome fruit (see *UC IPM Pest Management Guidelines* for apples and for pears at http://www.ipm.ucdavis.edu/PMG/). Sanitation includes removal of winter weeds and thinning of fruit. If insecticide treatment is necessary, several reduced-risk insecticides are available for control of LBAM. Good early-season control is essential.

If a suspected LBAM caterpillar is found, collect it and the webbed leaves or fruit where it is feeding and take the sample to the local agricultural commissioner.

Citrus and Avocado. Citrus crops in California are attacked by a number of leafroller pests (fruittree leafroller, Amorbia, omnivorous leafroller, orange tortrix). Amorbia (western avocado leafroller) is the main leafroller pest of avocado, with orange tortix being a minor pest in coastal areas. Leafrollers usually are minor or sporadic pests in citrus and avocado because parasites keep their populations below damaging levels. LBAM is damaging to citrus grown in Australia and is a minor pest of avocado in New Zealand. Although it cannot be predicted how serious it may become on citrus and avocado in California, it is likely to be a minor pest as long as natural enemies aren't severely disrupted by broad-spectrum pesticides. However, if LBAM were found in citrus and avocado growing areas of California, quarantine restrictions, if enacted, would have a serious economic impact on exports.

Impact on citrus is likely to be similar to damage from Amorbia, which feeds in the spring on new flush, newly set fruit, or on ripening Valencias. Early in spring, young larvae feed mostly on new growth flushes, often resulting in curled leaf terminals. Damage to young fruit occurs when the larvae web and feed under the calyx end of the fruit causing a ring scar similar to citrus thrips. Damage to maturing fruit occurs when larvae tie leaves to the fruit, feeding on the rind and sometimes boring inside. This injury provides entry sites for secondary decay organisms, and fruit will drop within 1 to 2 weeks. Fruittree leafroller is primarily a pest when it attacks older fruit, including ripening Valencias, navels, and grapefruit. Whether LBAM in California would become a pest of older fruit is unknown.

Impact on avocado also is likely to be similar to damage from Amorbia. Economic damage occurs primarily when larvae web leaves to fruit or feed among fruit touching in a cluster. Larvae feed on fruit skin, causing a scarring that results in downgrading or culling of fruit.

Look for LBAM under the sepals at the calyx end of young citrus fruit, under leaves webbed against maturing fruit, and where avocado fruit touch in clusters. Monitoring recommendations for Amorbia in the *UC IPM Pest Management Guidelines* for citrus and avocado may be useful. Monitor for signs of larval activity throughout the year because LBAM larvae remain active during the winter.

Parasitoids such as *Macrocentrus* spp., *Cotesia (Apanteles)* spp., and *Exochus* spp. commonly attack leafroller larvae, and predators such as spiders, lacewings, assassin bugs, and minute pirate bugs attack the eggs and larvae. The presence of LBAM in citrus and avocado orchards will probably provide an additional food source for these natural enemies.Management programs are already in place for the common leafrollers, and the reduced-risk insecticides (e.g., spinosad and Bt) recommended for their control are also recommended for LBAM suppression. In avocado, Bt applications may be effective on young larvae. In citrus, Bt may be applied before petal fall. At or after petal fall, a tank mix of spinosad plus either chlorpyrifos or a pyrethroid could be used to control LBAM; for more information see the *UC IPM Pest Management Guidelines* for citrus and avocado at http://www.ipm.ucdavis.edu/PMG/.

Nut Crops. Several leafroller species occur in the nut-producing areas of California, but do not cause significant damage to these crops. It is not anticipated that LBAM would become a significant pest. Because leafrollers are not found in or on nuts after they are harvested, hulled, and dried, LBAM is not a quarantine concern for these crops.

POSSIBLE IMPACT ON RESIDENTIAL AREAS

LBAM was first detected in California in a residential neighborhood. Quarantine and eradication efforts include residential areas in all the affected counties.

Detection. The primary method of detecting LBAM is pheromone traps put out by CDFA and the county agricultural commissioners and checked regularly by state biologists. Residents and businesses may be asked to allow one to be placed on their property.

If LBAM is found in a neighborhood, the area will be put under a quarantine by CDFA, which means that no one can move affected plants, vegetables, flowers or fruit from the quarantined area and must follow other local restrictions. In addition, community gardens within the quarantine area must be issued a compliance agreement from their county agricultural commissioner that allows movement of produce out of the garden, and all green waste from gardens must be disposed of through the local municipal green waste services to be sure of proper destruction.

If LBAM is found, CDFA and the county agricultural commissioner may make an eradication treatment with an insecticide. Currently an organic formulation of *Bacillus thuringiensis* (Bt) is being used for residential treatments. This material has low toxicity to humans and wildlife and is safe for the environment.

If you find a moth or caterpillar that resembles LBAM in your garden, take it to your county agricultural commissioner's office for identification or call the CDFA Pest Hot Line at (800) 491-1899. Many other common leafrollers resemble LBAM and it is difficult to distinguish among them.

Controlling LBAM in Your Garden. Currently, monitoring and control of LBAM in all locations is being done by CDFA and the county agricultural commissioners.

Although LBAM attacks many types of plants, it is not likely to cause serious damage to them in backyard situations. In many cases, treatment would not be needed in backyards, except to limit spread of this pest to commercial agriculture where the impact could be very serious. However, where LBAM is causing significant damage, it can be controlled effectively with several low-toxicity home-use insecticides, including *Bacillus thuringiensis* and spinosad. These materials must be applied to the larval (caterpillar) stage of the insect and repeat applications may be necessary. Good coverage of all plant surfaces is necessary for effective control.

For more information, check with the county agricultural commissioner for local restrictions. Also see the CDFA

LBAM Web page (http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html) for regularly updated maps of new infestations. Regulatory requirements for community gardens in quarantined areas are spelled out in the Light Brown Apple Moth Regulatory Procedures Manual available on the Web page.

AGRICULTURE–URBAN INTERFACE

People living close to agricultural operations should be aware that there may be occasions when nearby growers will be applying pesticides more often than usual. This is likely to be a short-term occurrence and is necessary in order to meet regulatory requirements and contain the spread of a pest that can cause great damage to California's economy.

Where agricultural operations are close to homes, schools, or other nonagricultural situations, growers should consider using less-toxic materials (as allowed by regulations), larger droplet size, or a spray additive to reduce drift.

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Precautions for Using Pesticides

Pesticides are poisonous and must be used with caution. READ THE LABEL BEFORE OPENING A PESTICIDE CONTAINER. Follow all label precautions and directions, including requirements for protective equipment. Apply pesticides only on the crops or in the situations listed on the label. Apply pesticides at the rates specified on the label or at lower rates if suggested in this publication. In California, all agricultural uses of pesticides must be reported. Contact your county agricultural commissioner for further details. Laws, regulations, and information concerning pesticides change frequently. This publication reflects legal restrictions current on the date next to each pest's name.

Legal Responsibility. The user is legally responsible for any damage due to misuse ofpesticides. Responsibility extends to effects caused by drift, runoff, or residues.

Transportation. Do not ship or carry pesticides together with food or feed in a way that allows contamination of the edible items. Never transport pesticides in a closed passenger vehicle or in a closed cab.

Storage. Keep pesticides in original containers until used. Store them in a locked cabinet, building, or fenced area where they are not accessible to children, unauthorized persons, pets, or livestock. DO NOT store pesticides with foods, feed, fertilizers, or other materials that may become contaminated by the pesticides.

Container Disposal. Dispose of empty containers carefully. Never reuse them. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Consult your county agricultural commissioner for correct procedures for handling and disposal of large quantities of empty containers.

Protection of Nonpest Animals and Plants. Many pesticides are toxic to useful or desirable animals, including honey bees, natural enemies, fish, domestic animals, and birds. Crops and other plants may also be damaged by misapplied pesticides. Take precautions to protect nonpest species from direct exposure to pesticides and from contamination due to drift, runoff, or residues. Certain rodenticides may pose a special hazard to animals that eat poisoned rodents.

Posting Treated Fields. For some materials, restricted entry intervals are established to protect field workers. Keep workers out of the field for the required time after application and, when required by regulations, post the treated areas with signs indicating the safe re-entry date. Check with your county agricultural commissioner for latest restricted entry interval.

Preharvest Intervals. Some materials or rates cannot be used in certain crops within a specified time before harvest. Follow pesticide label instructions and allow the required time between application and harvest.

Permit Requirements. Many pesticides require a permit from the county agricultural commissioner before possession or use. When such materials are recommended, they are marked with an asterisk (*) in the treatment tables or chemical sections of this publication.

Processed Crops. Some processors will not accept a crop treated with certain chemicals. If your crop is going to a processor, be sure to check with the processor before applying a pesticide.

Crop Injury. Certain chemicals may cause injury to crops (phytotoxicity) under certain conditions. Always consult the label for limitations. Before applying any pesticide, take into account the stage of plant development, the soil type and condition, the temperature, moisture, and wind. Injury may also result from the use of incompatible materials.

Personal Safety. Follow label directions carefully. Avoid splashing, spilling, leaks, spray drift, and contamination of clothing. NEVER eat, smoke, drink, or chew while using pesticides. Provide for emergency medical care IN ADVANCE as required by regulation.

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Plant Health
Inspection
Service

Treatment Program for Light Brown Apple Moth in Santa Cruz and Northern Monterey Counties, California

Environmental Assessment, September 2007

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Table of Contents

I. Introduction

A. Biology of Light Brown Apple Moth

The light brown apple moth (LBAM) (*Epiphyas postvittana*) is native to Australia where it is an economically important pest on many fruit crops. The LBAM attacks a wide variety of plants. A recently compiled LBAM host list (USDA, 2007a; see appendix A) indicates there are at least 2,042 different plants that are reported to be hosts of LBAM. The list includes numerous native plants, forest species, and over 200 agronomically important crops (appendix A). In addition to Australia, LBAM has also been found in New Zealand, New Caledonia, Hawaii, and the British Isles.

The moth lays eggs in overlapping masses, preferably on leaves, but also on fruit and stems of the host plant. The larvae hatch and then pass through six stages of growth reaching approximately 18 millimeters (mm) in length before pupation. Young larvae are pale yellow while the mature larvae are pale green (Mo, 2006). Larvae will feed on leaves and fruit from susceptible host plants. In all stages, larvae will construct silken shelters at the feeding site which is where pupation occurs. Both female and male adults are light brown in color. The females are distinguished by a dark spot in the center of the front wings when folded. The number of LBAM generations produced in a growing season varies from one to over four, depending on environmental conditions (Danthanarayana, 1983; Mo et al., 2006), although the climate in California may allow four to five generations to occur in the infested counties. In cases where multiple generations occur in a season, the population can build to economically important thresholds quickly.

B. History of Infestation in California

The California Department of Food and Agriculture (CDFA) was notified on February 6, 2007, that LBAM had been found in 2006 and subsequently identified by an Australian expert from a site near Berkeley in Alameda County, California. This initiated CDFA trapping which resulted in the finding of additional moths beginning February 27. On March 16, 2007, the Agriculture Research Service Systematic Entomology Laboratory in Washington, DC confirmed that the original find was positive for LBAM. In response, pheromone-baited traps were placed in Alameda and Contra Costa Counties to determine where LBAM populations existed in the area. On April 20, 2007, CDFA issued a quarantine of at least 182-square miles in Alameda, Contra Costa, San Francisco, Marin, and Santa Clara Counties.

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) issued a Federal quarantine order on May 2, 2007, requiring trapping, inspection, and certification of all nursery stock and host commodities from quarantine areas. The original quarantine area consisted of only eight counties. Today the quarantine area includes the following counties: Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, and Solano. The quarantine area will continue to expand if LBAM is identified in new counties.

Since March 2007, more than 41,000 traps have been placed throughout California and approximately 8,000 moths have been confirmed as LBAM (CDFA, 2007a). Most of the captures (99 percent), however, are from traps located in two specific geographical areas. The first area, representing 87 percent of all LBAM captures, encompasses southern Santa Cruz and northern Monterey Counties. The second area, which represents approximately 12 percent of captures, includes contiguous portions of northwest Alameda, western Contra Costa, and northern San Francisco Counties. The remaining 1 percent came from mostly single trap captures in Los Angeles, Marin, Napa, San Mateo, Santa Clara, and Solano Counties.

In May, 2007, APHIS convened a group of international scientific experts (the Technical Working Group or TWG) to provide recommendations on short- and long-term plans to contain, control, and eradicate LBAM in California. The TWG toured the infested region on May 16 and concluded with a 2-day meeting in San Jose, California. They evaluated the distribution of LBAM and suggested treatment options for isolated areas and the main population areas. The recommendation of TWG was to prevent LBAM from spreading by first containing and eradicating LBAM from the outer edges of its range, and then eliminating the core population centers.

CDFA and APHIS started treatment of isolated populations in June 2007. To date, isolated populations in Napa, Oakley, Danville, Dublin, Sherman Oaks, San Jose, and Vallejo have been treated with pheromone twist ties, a mating disruption technique. The areas of Napa and Oakley also were treated with three ground applications of *Bacillus thuringiensis kurstaki* (Btk), a biologically based pesticide that is effective against early larval stages of most lepidopterans prior to the use of the pheromone twist ties.

Trapping results indicated that populations in the area from the Salinas River south to the Monterey Peninsula were growing and, if left

unchecked, could become an extension of the more heavily populated area around Soquel and southern Santa Cruz. In an effort to constrict this growth, the area from Marina and Seaside southward to and including most of the Monterey Peninsula was aerially treated on four consecutive nights beginning on the night of September 9 and ending in the early morning hours of September 13, 2007, with microencapsulated pheromone to disrupt LBAM mating. The total treatment area was approximately 36,500 acres. A second treatment of this area is anticipated after 30 days (the effective life of the microencapsulated pheromone once it has been applied). This treatment is currently scheduled to begin on or about October 9. Pheromone traps are in place and will remain throughout the treatment period and beyond to measure LBAM populations. This information will be used to evaluate the effectiveness of the treatments and for determining what additional treatments will be made to complete eradication efforts in this area.

C. Purpose and Need

APHIS is responsible for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act (7 United States Code (U.S.C.) 7701 et seq.). Therefore, it is important that APHIS take the steps necessary to eradicate LBAM from areas in California to prevent its spread to susceptible host plants throughout the United States.

Since LBAM is a new pest to the North American Continent, there is little information about how the moths will respond to treatment. The lack of experience with LBAM has made it difficult to determine the best eradication approach to take in California: therefore, the recommendations of TWG, several of whose members have direct experience with control of LBAM in Australia and New Zealand, has been especially welcomed. Based upon their recommendations, the current eradication efforts have mainly relied on mating disruption with different types of pheromone treatments.

The Santa Cruz-northern Monterey County population of LBAM is the largest in the State. Trapping results from here account for approximately 87 percent of all LBAM trapped to date (CDFA, 2007a). These moths are expected to remain active into November, and perhaps beyond, depending upon the weather conditions at local sites. A delay in treating this population is likely to result in an increased number of moths overwintering; therefore, it is desirable to begin treatments as early as possible since the pheromone is most efficacious when populations are low. The timing of applications to maximize efficacy based on the biology of LBAM is consistent with

integrated pest management strategies for controlling pests. It is expected that at the sometime around the end of October or beginning of November, the supplies of the pheromone will be sufficient to treat approximately 60,000 acres (see appendix B). Rather than waiting until next year, being able to provide a mating disruption treatment to the most populous LBAM center this year is expected to be more advantageous to the overall eradication efforts.

The remaining population center near San Francisco is less dense and, therefore, of less immediate concern. Treatment in this area will likely begin in spring 2008, after an assessment of this year's treatments has been completed.

Three environmental assessments (EAs) have been completed as areas have been designated for treatment. Those EAs include: Eradication of Isolated Populations of Light Brown Apple Moth in California, June 2007(USDA, 2007b); Eradication of Isolated Populations of Light Brown Apple Moth in California, Revised Environmental Assessment, July 2007 (USDA, 2007c); and, Treatment of Light Brown Apple Moth in the Seaside Area in California, Environmental Assessment, July 2007 (USDA, 2007d). These EAs are incorporated into this EA by reference.

This EA will analyze the environmental impacts anticipated from the proposed pheromone treatment of LBAM in Santa Cruz and northern Monterey Counties (see appendix B).

This EA has been prepared consistent with the National Environmental Policy Act of 1969 (NEPA)(42 U.S.C. 4321, et seq) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed action, if implemented, may affect the quality of the human environment. We are providing a 30-day public comment period for response to this EA. (Please send any comments to Carole Johnson, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, 4700 River Road, Unit 134, Riverdale, MD 20737.)

D. Affected Environment

The proposed treatment area consists of Santa Cruz County and northern Monterey County (see appendix B). LBAM has been found throughout much of this area. In fact, this area has approximately 87 percent of all LBAM captures in the State trapping program (CDFA, 2007a). As such, the entire area would be subject to the proposed pheromone treatments for mating disruption. This section

provides a general overview of the proposed treatment area, focusing on land use and host susceptibility.

Santa Cruz and northern Monterey Counties lie within three major land resource areas in California (USDA, 2006)—the Coastal Redwood Belt, the Central Coast Valley, and the Central Coast Range. The extreme northwest portion of Santa Cruz County lies within the Coastal Redwood Belt major land resource area. This area has a wide elevation range, extending from sea level along the Pacific coast to approximately 3,900 feet for some coastal range peaks. The average annual rainfall ranges from 23 to 98 inches, with an average annual temperature range of 49 to 59 °F.

Land use is dominated by forests followed by grassland and, to a lesser extent, farming and urban development. Vegetables and fruits are grown in areas that have favorable weather and soils. Several State parks exist within this major resource land area including Henry Cowell Redwoods, Fall Creek, Natural Bridges, Twin Lakes, New Brighton and Wilder Ranch. These parks contain a diverse population of plants, some of which are considered hosts for LBAM. For example, parks such as Henry Cowell Redwoods State Park contain Douglas fir, oak, and pine species, as well as the redwood and madrone, which are all occasional or common hosts for LBAM (appendix A). In another example, using the Wilder Ranch State Park plant inventory, the previously listed species as well as other plants such as California sagebrush, coyote brush, California bay and brome grasses are additional plants that have known susceptibility to LBAM (Wilder State Park 2002).

The above list of host species is not inclusive and does not include all known host plants for LBAM that may occur in the park, nor does it account for those plant species that have an unknown host susceptibility to LBAM. Several LBAM-susceptible native coastal plants and other susceptible host plants also exist in State parks that occupy the coastal areas. Urban development is minor as compared to the rest of the county with towns such as Boulder Creek, Felton, and Ben Loman being the major towns within the eastern edge of the Coastal Redwood area. Based on the presence of LBAM in other residential areas and the availability of hosts in the surrounding area, it is anticipated that susceptible host plants could be present in these towns.

The Central Coastal Valley region comprises the second area of the affected environment in Santa Cruz and northern Monterey Counties. Within the coastal valley area, the average precipitation ranges from

11 to 66 inches with most of the precipitation occurring as low or moderate frontal storms during winter.

Land use is divided primarily between cropland, grassland, and urban development, and, to a lesser extent, forests. Agriculture within the valley is principally truck crops, wine grapes, strawberries, and other fruits, cut flowers, small grains, hay, and pasture grown under irrigation. Several crops grown in this area, for example, strawberries and grapes, are common hosts for LBAM. Small grains are also grown under non-irrigated conditions (USDA, 2006). Urban development within the area includes Santa Cruz, Soquel, Rio Del Mar, and Watsonville, as well as other smaller towns. The coastal valley area extends as a small strip down to and including the town of Salinas, which is part of the agriculturally important Salinas Valley.

Santa Cruz, as well as the surrounding towns, currently have LBAM infestations that are expected to expand if left untreated, based on the number of susceptible hosts in urban and open areas. This area also has several State parks and beaches, such as Sunset State Beach, Manresa State Beach, and New Brighton State Beach, that occur along the coast. Several of the State beach parks have diverse plant life that includes multiple host plants for LBAM; for example, the coastal scrub and woodland habitats contain species such as coyote brush and Monterey pine, as well as other plants that are common host plants for LBAM.

The Central California Coast Range occupies the remainder of the potential area of pheromone treatment within southwestern Santa Cruz and northern Monterey County. This area has an average annual precipitation of 6 to 20 inches with most of the precipitation evenly distributed between the fall, winter, and spring, with low amounts in the summer (USDA, 2006).

Greater than half of the land use is in grassland followed by forest, cropland, and urban development. Agriculture in the area is limited to grains, with some fruit and vegetable production. Urban development consists of towns such as Prunedale and Castroville, as well as several other smaller towns in the area. Similar to areas identified in Santa Cruz and Monterey Counties, multiple native and agricultural species are present that are considered to be common hosts for LBAM. Natural areas, such as Royal Oaks State Park and the Salinas River National Refuge, include plants that are known hosts for LBAM.

Monterey Bay National Marine Sanctuary (MBNMS) extends along both Santa Cruz and Monterey Counties. The sanctuary is a federally protected marine area offshore of California's central coast. It

stretches from Marin to Cambria, and encompasses a shoreline length of 276 miles and 5,322 square miles of ocean. It supports a diverse marine ecosystem and is home to numerous mammals, seabirds, fishes, invertebrates, and plants.

II. Alternatives

This EA analyzes the potential environmental consequences of the proposed action to eradicate populations of LBAM from Santa Cruz and northern Monterey Counties, California, where LBAM have been detected. Two alternatives are being considered: (1) no action by APHIS to eliminate LBAM, and (2) treatment of LBAM using applications of a pheromone for mating disruption.

A. No Action

The no action alternative consists of maintaining the current Federal order without further action by APHIS. Private landowners would manage LBAM infestations, as appropriate.

Pursuant to the Federal order, the following regulated articles would not be moved interstate from a quarantine area except in accordance with this order:

- Nursery stock;
- Cut flowers, garlands, wreaths, or greenery of any plants;
- Trees and bushes, including cut Christmas trees;
- Greenwaste;
- Fruits and vegetables;
- Hay, straw, fodder, and plant litter;
- Bulk herbs and spices;
- Any other products, articles, or means of conveyance of any character whatsoever, when it is determined by an inspector that they present a hazard of spread of LBAM.

B. Treatment Alternative

The treatment alternative consists of maintaining the Federal quarantine order to prevent the artificial spread of LBAM, as well as using an insect pheromone to treat areas within Santa Cruz and northern Monterey Counties where LBAM has been detected.

Insect sex pheromones are compounds that are naturally produced by members of one sex for the purpose of attracting the opposite sex of the same species. Distribution of pheromone throughout an area

makes it difficult for the male to locate the female, thus disrupting mating for the species. For several lepidopteran pest species, including LBAM, the pheromone has been isolated and synthetically reproduced in order to be used to attract moths and, therefore, disrupt reproduction. There are two formulations of pheromone available to treat LBAM—a general tortricid pheromone that is attractive to species of the family Tortricidae (leafrollers), of which LBAM is a member, and an LBAM-specific pheromone. The LBAM-specific pheromone will be used when available.

Pheromone can be applied via a dispenser suspended from the ground, or applied by ground or aerial application equipment in microencapsulated capsules or flakes. When used at efficacious levels, the pheromone reduces the ability of male LBAM to locate and mate with females.

1. Dispensers

The dispensers are used at a rate of 250 dispensers per acre and are effective for 90 days before they need to be replaced.

2. Micro-encapsulated

The microencapsulated pheromone is effective for 30 days. Therefore, several applications may be needed per year. Applications of the LBAM-specific pheromone would be at the rate of 15 grams of active ingredient per acre (gai/A) and 20 gai/A for the general tortricid pheromone.

Due to the size of the proposed treatment area, aerial application of the microencapsulated pheromone will be the predominant treatment method. Aerial pheromone applications are planned to be conducted overnight, thus minimizing exposure of people. As infested areas are reduced in size over time, the use of dispensers may become more practical and, therefore, may increase in use. The initial treatment area is anticipated to consist of three blocks totalling approximately 60,000 acres located in the Soquel, Prunedale and north Salinas areas (see appendix B). Over time, however, the entire infested area within the Santa Cruz–northern Monterey population center will receive treatment. Any one area within this population center is likely to receive at least two and probably several treatments until it is determined that LBAM has been eradicated from the site. Complete eradication within the Santa Cruz and northern Monterey area is expected to take several years.

III. Environmental Impacts

A. No Action

Under the no action alternative, the current Federal order would remain in place without the application of pheromone. The host list for LBAM contains numerous species (trees, shrubs, and crops) that are common throughout the treatment area (see appendix A). Without treatment, LBAM would be allowed to flourish in the existing area and, consequently, continue to spread into surrounding areas. LBAM has the potential to severely damage residential landscapes, orchards, and agricultural crops.

Private individuals may utilize insecticides to control LBAM. However, without a coordinated treatment plan, reinfestation from adjacent untreated, infested sites will occur and would require additional applications, thus increasing pesticide loading to the environment. Alternative pesticides may have higher use rates and increased risks to human health and the environment. While several pesticides can be used against LBAM larvae, the only pesticide currently known to be efficacious against both eggs and larvae of LBAM is chlorpyrifos.

In addition to environmental impacts, LBAM could cause an estimated $160 to $640 million annually in crop damage and control costs if it spreads to agricultural production areas in the 11 affected counties (CDFA, 2007a). These estimated values were derived from the agricultural impacts in Australia and New Zealand from LBAM. If LBAM were to spread throughout the entire State of California damage and costs could reach up to $2.4 billion annually. The presence of LBAM in the quarantine counties has caused restrictions on domestic and foreign trade. In 2003, California shipped over $7.2 billion in food and agricultural commodities around the world (CASS, 2004). The loss of revenue from these restrictions is currently unknown; however this loss could be significant if LBAM becomes established throughout the State of California.

B. Treatment Alternative

As mentioned previously, there are two types of synthetic pheromones available to treat LBAM. The leafroller pheromone contains a compound that female leafrollers emit naturally to attract male moths. The LBAM-specific compound contains both the general female leafroller chemical as well as a chemical produced solely by the LBAM female. The LBAM-specific pheromone consists of, (E)-11-tetradecen-1-yl acetate and (E,E)-9,11-tetradecadien-1-yl acetate.

Both compounds have been identified in extracts of female LBAM and are active as a coalitive pair when combined (Bellas et al., 1983). The pheromone can be applied in individual dispensers, or, for larger areas, ground or aerial equipment can be used to broadcast spray the material.

The dispensers utilize the LBAM-specific pheromone that is contained within a sealed polyethylene tube containing 163.25 milligrams (mg) of (E)-11-tetradecen-1-yl acetate and 6.74 mg of (E,E)-9,11-tetradecadien-1-yl acetate. A wire is fused inside the plastic so that the dispenser can be twisted around a branch. The pheromone is released into the surrounding area and disrupts the ability of male LBAM to locate females. This treatment method has been shown to be an effective means of LBAM control in citrus, grapes, apple, and apricot orchards when adequate numbers of dispensers are used (Mo et al., 2006).

Over larger areas, pheromone can be applied in a biodegradable 80 to 150 micrometers (μm) microencapsulated polymer which has been shown to be an effective method of application when applied appropriately (Wilkins, 1990; Knight and Larsen, 2004; Mihou et al., 2007). The microencapsulated pheromone can be applied either by ground or aerial equipment and can consist of either the leafroller pheromone (at a rate of 20 gai/A) or the LBAM-specific pheromone (at a rate of 15 gai/A).

1. Toxicity

Based on available toxicity data, both pheromones have low acute oral and dermal toxicity in rats with median lethal dose ($LD_{50;}$ i.e. the dose required to kill 50 percent of a test population) values of greater than 5,000 milligram per kilogram (mg/kg) and 2,000 mg/kg, respectively. Acute inhalation toxicity is also low based on the acute inhalation median lethal concentration ($LC_{50;}$ i.e. the concentration required to kill 50 percent of a population) value of greater than 5.25 (grams per liter) g/L. These values are consistent with the toxicity profile for other lepidopteran pheromones that have been tested (OECD, 2002; Weatherston and Stewart, 2002). Available data suggests that lepidopteran pheromones have very low chronic toxicity to mammals (OECD, 2002; EPA, 1996). The pheromone is considered a slight to moderate dermal irritant and is not considered to be carcinogenic or mutagenic (Pacific Biocontrol Corporation, 2007).

Data for structurally similar pheromones indicate there is very low acute toxicity to birds with LD_{50} values greater than 2,000 mg/kg (Weatherston and Stewart, 2002). Toxicity to aquatic organisms is unknown for these two pheromones specifically; however, data for other pheromones suggest that fish LC_{50} values greater than 100 parts

per million (ppm), and aquatic invertebrate toxicity values range in the upper parts per billion (ppb) to low ppm range (Weatherston and Stewart, 2002; PMRA, 1994; Inscoe and Ridgway, 1992). Toxicity values for aquatic invertebrates may be misleading. Since the pheromone is hydrophobic, large amounts of pheromone must be added to the test chamber in order to obtain detectable amounts of pheromone in the water or else a solvent must be used. In the proposed application no solvent will be used and application rates are low at 15 to 20 grams a.i./acre. In addition, the pheromone is considered insoluble and it would not be possible for a body of water to achieve levels of dissolved pheromone that could approach toxic levels for aquatic invertebrates.

In summary, there are no reported adverse effects to humans, domestic or other nontarget animals, or the environment from the use of these pheromones.

2. Exposure and Risk

Lepidopteran pheromones are sensitive to ultraviolet radiation and oxidation where they breakdown rapidly in terrestrial and aquatic environments. The rapid breakdown and volatilization of lepidopteran pheromones and their mammalian toxicological profile have resulted in the Environmental Protection Agency (EPA) waiving the requirement of a food tolerance when applications do not exceed 150 grams of active ingredient per acre per year (g active ingredient/ac/year) (EPA, 2007). In addition to rapid degradation, lepidopteran pheromones have very low solubility or are insoluble in water suggesting low aquatic residues (OECD, 2002). This specific pheromone is reported to be insoluble in water (Pacific Biocontrol Corporation, 2007).

Exposure to humans, domestic and other nontarget animals, and the environment is expected to be minimal. In the case of the dispenser application, the pheromone is inside a plastic tube that is suspended in a tree; therefore, no human-related exposure from residues or drinking water is expected. The same would also be true for terrestrial nontarget organisms where exposure would be expected to be minimal. Exposure to aquatic organisms would not be expected when dispensers are used because label language prohibits discarding dispensers in surface water.

Pheromone that would be applied as a microencapsulated material in open and residential areas would not pose a risk to human health due to the known mammalian toxicity profile for lepidopteran pheromones and their environmental fate. Based on the known toxicology data for the pheromone, as well as similar types of compounds, acute and chronic effects do not occur at the highest concentrations tested; none

of the pheromones, to date, have shown any potential mutagenic or carcinogenic activity (Touhey, 1990; EPA, 1996; OECD, 2002). In addition to the lack of known toxicological effects, the exposure potential for humans is very low. No dietary exposure from food is expected due to the volatility of the pheromone. Incidental exposure through drinking water sources or swimming pools is expected to be minimal since the pheromone is insoluble in water and would remain at the surface volatilizing into the atmosphere. Both the low toxicity and lack of significant exposure result in minimal risk to human health from pheromone applications.

The only nontarget species that may be impacted by the use of pheromones could be native (or exotic) leafrollers that may be present and that could have their mating disrupted by the use of leafroller pheromone. Any impact to leafrollers would be minimal and temporary as populations would quickly recover due to immigration of leafrollers from adjacent, untreated areas. The use of LBAM-specific pheromone would only affect LBAM and perhaps a few other leafrollers. No other nontarget species are expected to be impacted. LBAM-specific pheromone is planned to be used in the initial application at Santa Cruz, and will be the preferred pheromone for all treatments based on available supplies.

The microencapsulated pheromone will also pose minimal risk to terrestrial wildlife and aquatic organisms. This is based on the known toxicity data for these types of pheromones, as well as the low exposure that would occur from ground or aerial pheromone applications. In addition, the pheromone will not be applied directly to open water per label instructions. As a means to quantify these conclusions, a screening level ecological risk assessment was prepared to address potential risk to nontarget fish and wildlife (see appendix C).

C. Cumulative Effects

Cumulative effects from potential pheromone use over several years is not expected to occur based on the known toxicity data, specificity of the pheromones to LBAM and leafrollers, and minimal risk to human health and the environment. Cumulative impacts to nontarget butterflies and moths, except for tortricids, from the use of pheromones are not anticipated because the pheromones are selective for LBAM and leafrollers. The cumulative impacts to leafrollers will be minimized because LBAM-specific pheromone will be used when available.

Treatments of isolated populations of LBAM have begun in a number of sites including Napa, Oakley, Danville, Dublin, Sherman Oaks, San Jose and Vallejo. Approximately 35 to 40 isolated populations have been identified; there is potential for additional sites to be identified in the future. Treatments in the isolated areas have primarily consisted of application of pheromone dispensers that are removed after 90 days. These areas are small in nature and occur outside of any aerially treated areas.

Recently, the Marina–Seaside–Monterey Peninsula area was treated with aerial application of microencapsulated pheromone. A second aerial application is anticipated in the near future. This area is adjacent to but not overlapping the proposed treatment area. Due to the nature of the pheromone, the minimal environmental effects, and the fact that the treatment areas do not overlap, it is unlikely that there will be any cumulative impacts with the use of this pheromone in isolated treatment areas of the Marina–Seaside–Monterey Peninsula and the Santa Cruz and Monterey County areas.

Future treatments for LBAM will be evaluated under subsequent EAs. The environmental impacts from these treatments will be evaluated in combination with treatments already underway.

D. Threatened and Endangered Species

Section 7(a)(2) of the Endangered Species Act (ESA) and its implementing regulations require all Federal agencies to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. CDFA and APHIS are working with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) to insure that treatment activities considered in this EA do not affect listed species or their designated or proposed critical habitats. No treatments will occur in the treatment area until CDFA and APHIS have completed a determination of effects on listed species and their habitats and, if necessary, Section 7 consultation with FWS and/or NMFS has been concluded.

APHIS has designated CDFA as its non-Federal representative for the purpose of conducting informal consultation with FWS and NMFS on APHIS activities associated with the LBAM eradication program in California and will work with CDFA to develop all necessary consultation documents. Legally, APHIS retains ultimate responsibility for compliance with Section 7 of the ESA.

CDFA and APHIS will continue to work in close cooperation with NMFS and FWS during implementation any LBAM eradication efforts to insure that potential impacts to listed species and their designated critical habitats are avoided or minimized to the extent possible, and are consistent with the statutory and regulatory requirements of Section 7 of ESA.

E. Other Considerations

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations," focuses Federal attention on the environmental and human health conditions of minority and low-income communities and promotes community access to public information and public participation in matters relating to human health or the environment. This EO requires Federal agencies to conduct their programs, policies, and activities that substantially affect human health or the environment in a manner so as not to exclude persons and populations from participation in or benefiting from such programs. It also enforces existing statutes to prevent minority and low-income communities from being subjected to disproportionately high or adverse human health or environmental effects. APHIS has determined that the environmental and human health effects from the proposed applications for treatment of LBAM in California are minimal and are not expected to have disproportionate adverse effects to any minority or low-income populations.

EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," acknowledges that children, as compared to adults, may suffer disproportionately from environmental health and safety risks because of developmental stage, greater metabolic activity levels, and behavior patterns. This EO (to the extent permitted by law and consistent with the agency's mission) requires each Federal agency to identify, assess, and address environmental health risks and safety risks that may disproportionately affect children. Aerial pheromone applications are planned to be conducted overnight, thus minimizing exposure of people, and especially children; however the low toxicity of the pheromone minimizes any potential risk to children.

The Monterey Bay National Marine Sanctuary (sanctuary) is adjacent to the proposed treatment area. This is a federally protected marine area offshore of California's central coast. It stretches from Marin County to Cambria; it encompasses a shoreline length of 276 miles and 5,322 square miles of ocean. This area supports a diverse marine ecosystem and is home to numerous mammals, seabirds, fish, invertebrates, and plants in a remarkably productive coastal

environment. The sanctuary was established for the purposes of resource protection, research, education, and public use. Any discharge or deposit of foreign materials in the sanctuary that would be injurious requires a permit from the sanctuary.

Consultations with the marine sanctuary staff, prior to the recent treatment in the Marina–Seaside–Monterey Peninsula, identified areas of concern to the sanctuary. These concerns centered around the potential for aerially applied material to drift from the intended target and the risk that would be posed to marine resources, should that occur. APHIS and CDFA provided the sanctuary with additional information regarding the procedures and protocols of the aerial application of pheromone in the area, including transect maps. APHIS also provided additional risk assessment documentation (appendix C) that demonstrated that, even if some pheromone material were to enter water, there is little likelihood that it could result in any negative impacts on marine life. Testing indicates that toxicity thresholds are many times higher than the environmental concentrations that would be expected even if the pheromone were directly applied to the water. In addition, the pheromone is not soluble in water and quickly volatilizes or breaks down due to ultraviolet light and, therefore, would not affect aquatic organisms.

APHIS continues to consult with the sanctuary staff to ensure that their concerns are addressed with regard to the proposed treatment in Santa Cruz and northern Monterey Counties.

CDFA has consulted with the Central Coast Regional Water Quality Control Board to ensure that water quality standards are not jeopardized by the proposed program. The Water Quality Control Board indicated that as long as the applications are done as they were in the recent Marina–Seaside–Monterey Peninsula application (that is, material is applied in accordance with the restrictions of the Section 18 pesticide label and direct applications to open water are avoided), they have no objections to the proposal and will not require a permit.

IV. Listing of Agencies and Persons Consulted

U.S. Fish and Wildlife Service
Ventura Fish & Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003

National Marine Fisheries Service
Southwest Regional Office
501 West Ocean Blvd, Suite 4200
Long Beach, CA 90802–4213

U.S. Department of Agriculture
Animal Plant Health Inspection Service
Plant Protection and Quarantine
Emergency and Domestic Programs
4700 River Rd. Unit 134
Riverdale, MD 20737

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services
4700 River Road, Unit 149
Riverdale, MD 20737

California Department of Food and Agriculture
Plant Health and Pest Prevention Services
1220 N Street
Sacramento, CA 95814–5607

California Environmental Protection Agency
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

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Appendix A. Light Brown Apple Moth Host List

Genus Species	Common Name	Genus Match Host Prevalence
Abelia spp.	(abelia)	Occasional
Abies	fir	Common
Abies ×shastensis	Shasta red fir	Common
Abies amabilis	Pacific silver fir	Common
Abies bracteata	bristlecone fir	Common
Abies concolor	white fir	Common
Abies concolor	white fir	Common
Abies grandis	grand fir	Common
Abies lasiocarpa	subalpine fir	Common
Abies lowiana		Common
Abies magnifica	California red fir	Common
Abies procera	noble fir	Common
Abies spp.	(fir)	Common
Acacia	acacia	Common
Acacia baileyana	cootamundra wattle	Common
Acacia cyclops	cyclops acacia	Common
Acacia dealbata	silver wattle	Common
Acacia decurrens	green wattle	Common
Acacia elata	cedar wattle	Common
Acacia farnesiana	sweet acacia	Common
Acacia greggii	catclaw acacia	Common
Acacia longifolia		Common
Acacia mearnsii	black wattle	Common
Acacia melanoxylon	blackwood	Common
Acacia paradoxa	paradox acacia	Common
Acacia podalyriifolia	pearl wattle	Common
Acacia pycnantha	golden wattle	Common
Acacia redolens	bank catclaw	Common
Acacia retinodes	water wattle	Common
Acacia saligna	orange wattle	Common
Acacia spp.	(acacias)	Common
Acacia verticillata	prickly Moses	Common
Acer	maple	
Acer campestre	hedge maple	
Acer circinatum	vine maple	
Acer glabrum	Douglas maple	
Acer glabrum	Greene's maple	
Acer glabrum	Rocky Mountain maple	
Acer glabrum	Torrey maple	
Acer macrophyllum	bigleaf maple	
Acer negundo	boxelder	
Acer negundo	California boxelder	
Acer saccharinum	silver maple	
Acer spp.	(maple)	
Achillea	yarrow	Common

Achillea filipendulina	fernleaf yarrow	Common
Achillea millefolium	California yarrow	Common
Achillea millefolium	common yarrow	Common
Achillea millefolium	giant yarrow	Common
Achillea millefolium	Pacific yarrow	Common
Achillea millefolium	western yarrow	Common
Achillea spp.	(yarrow)	Common
Acmena spp.	(lilly-pily tree)	Occasional
Actinidia spp.	(Chinese gooseberry, kiwi, kiwifruit)	Primary
Adiantum	maidenhair fern	Occasional
Adiantum ×tracyi		Occasional
Adiantum aleuticum	Aleutian maidenhair	Occasional
Adiantum capillus-veneris	common maidenhair	Occasional
Adiantum jordanii	California maidenhair	Occasional
Adiantum spp.	(maidenhair ferns)	Occasional
Aesculus	buckeye	Occasional
Aesculus californica	California buckeye	Occasional
Aesculus spp.	(horse chestnut, buckeye)	Occasional
Alnus	alder	
Alnus cordata	Italian alder	
Alnus incana	gray alder	
Alnus incana	thinleaf alder	
Alnus rhombifolia	White Alder	
Alnus rhombifolia	White Alder	
Alnus rubra	red alder	
Alnus spp.	(alder)	
Alnus viridis	green alder	
Alnus viridis	Siberian alder	
Alnus viridis	Sitka alder	
Amaranthus	pigweed	Occasional
Amaranthus albus	prostrate pigweed	Occasional
Amaranthus arenicola	sandhill amaranth	Occasional
Amaranthus blitoides	mat amaranth	Occasional
Amaranthus blitum		Occasional
Amaranthus blitum	purple amaranth	Occasional
Amaranthus californicus	California amaranth	Occasional
Amaranthus caudatus	love-lies-bleeding	Occasional
Amaranthus cruentus	red amaranth	Occasional
Amaranthus deflexus	largefruit amaranth	Occasional
Amaranthus fimbriatus	fringed amaranth	Occasional
Amaranthus hybridus	slim amaranth	Occasional
Amaranthus hypochondriacus	Prince-of-Wales feather	Occasional
Amaranthus palmeri	carelessweed	Occasional
Amaranthus powellii		Occasional
Amaranthus powellii	Powell's amaranth	Occasional
Amaranthus retroflexus	redroot amaranth	Occasional
Amaranthus spinosus	spiny amaranth	Occasional
Amaranthus spp.		Occasional
Amaranthus torreyi	Torrey's amaranthus	Occasional
Amaranthus tuberculatus	roughfruit amaranth	Occasional
Amaranthus watsonii	Watson's amaranth	Occasional

Antirrhinum	snapdragon	Occasional
Antirrhinum majus	garden snapdragon	Occasional
Antirrhinum spp.	(snapdragons)	Occasional
Apium	celery	Occasional
Apium graveolens	wild celery	Occasional
Apium nodiflorum	European marshwort	Occasional
Apium spp.	(celery)	Occasional
Aquilegia	columbine	Common
Aquilegia eximia	Van Houtte's columbine	Common
Aquilegia formosa	western columbine	Common
Aquilegia pubescens	Sierra columbine	Common
Aquilegia shockleyi		Common
Aquilegia spp.	(columbines)	Common
Arbutus	madrone	Common
Arbutus menziesii	Pacific madrone	Common
Arbutus spp.	Strawberry Tree	Common
Arctostaphylos	manzanita	
Arctostaphylos ×benitoensis		
Arctostaphylos ×campbelliae		
Arctostaphylos ×cinerea	Waldo manzanita	
Arctostaphylos ×helleri		
Arctostaphylos ×jepsonii		
Arctostaphylos ×laxiflora		
Arctostaphylos ×media		
Arctostaphylos ×parvifolia		
Arctostaphylos ×repens	PMC manzanita	
Arctostaphylos andersonii	Santa Cruz manzanita	
Arctostaphylos auriculata	Mount Diablo manzanita	
Arctostaphylos bakeri	Baker's manzanita	
Arctostaphylos bakeri	Baker's manzanita	
Arctostaphylos bakeri	The Cedars manzanita	
Arctostaphylos canescens	hoary manzanita	
Arctostaphylos canescens	Sonoma manzanita	
Arctostaphylos catalinae	Santa Catalina Island Manzanita	
Arctostaphylos columbiana	hairy manzanita	
Arctostaphylos confertiflora	Santa Rosa Island Manzanita	
Arctostaphylos cruzensis	La Cruz manzanita	
Arctostaphylos densiflora	Vine Hill manzanita	
Arctostaphylos edmundsii	Little Sur manzanita	
Arctostaphylos gabrielensis	San Gabriel manzanita	
Arctostaphylos glandulosa	Adams' manzanita	
Arctostaphylos glandulosa	Del Mar manzanita	
Arctostaphylos glandulosa	Eastwood's manzanita	
Arctostaphylos glandulosa	Zaca's manzanita	
Arctostaphylos glauca	bigberry manzanita	
Arctostaphylos glutinosa	Schreiber's manzanita	
Arctostaphylos hispidula	Gasquet manzanita	
Arctostaphylos hookeri	Franciscan manzanita	
Arctostaphylos hookeri	Hearst's manzanita	
Arctostaphylos hookeri	Hooker's manzanita	
Arctostaphylos hookeri	Mt. Tamalpais manzanita	

Arctostaphylos hookeri	Presidio manzanita
Arctostaphylos hooveri	Hoover's manzanita
Arctostaphylos imbricata	San Bruno Mountain Manzanita
Arctostaphylos insularis	island manzanita
Arctostaphylos klamathensis	Klamath manzanita
Arctostaphylos luciana	Santa Lucia manzanita
Arctostaphylos malloryi	Mallory's manzanita
Arctostaphylos manzanita	Contra Costa manzanita
Arctostaphylos manzanita	Konocti manzanita
Arctostaphylos manzanita	Roof's manzanita
Arctostaphylos manzanita	whiteleaf manzanita
Arctostaphylos manzanita	Wieslander's manzanita
Arctostaphylos mendocinoensis	pygmy manzanita
Arctostaphylos mewukka	Indian manzanita
Arctostaphylos mewukka	True's manzanita
Arctostaphylos montaraensis	Montara manzanita
Arctostaphylos montereyensis	Monterey manzanita
Arctostaphylos morroensis	Morro manzanita
Arctostaphylos myrtifolia	Ione manzanita
Arctostaphylos nevadensis	pinemat manzanita
Arctostaphylos nissenana	Nissenan manzanita
Arctostaphylos nortensis	Del Norte manzanita
Arctostaphylos nummularia	glossyleaf manzanita
Arctostaphylos obispoensis	serpentine manzanita
Arctostaphylos osoensis	Oso manzanita
Arctostaphylos otayensis	Otay manzanita
Arctostaphylos pacifica	Pacific manzanita
Arctostaphylos pajaroensis	Pajaro manzanita
Arctostaphylos pallida	Alameda manzanita
Arctostaphylos parryana	Parry manzanita
Arctostaphylos patula	greenleaf manzanita
Arctostaphylos pechoensis	Pecho manzanita
Arctostaphylos peninsularis	Peninsular manzanita
Arctostaphylos pilosula	La Panza manzanita
Arctostaphylos pringlei	pinkbracted manzanita
Arctostaphylos pringlei	Pringle manzanita
Arctostaphylos pumila	sandmat manzanita
Arctostaphylos pungens	pointleaf manzanita
Arctostaphylos purissima	La Purissima manzanita
Arctostaphylos rainbowensis	Rainbow manzanita
Arctostaphylos refugioensis	Refugio manzanita
Arctostaphylos regismontana	Kings Mountain manzanita
Arctostaphylos rudis	shagbark manzanita
Arctostaphylos silvicola	Bonny Doon manzanita
Arctostaphylos spp.	Manzanita
Arctostaphylos stanfordiana	Raiche's manzanita
Arctostaphylos stanfordiana	Rincon manzanita
Arctostaphylos stanfordiana	Stanford's manzanita
Arctostaphylos tomentosa	brittleleaf manzanita
Arctostaphylos tomentosa	dacite manzanita
Arctostaphylos tomentosa	rosy manzanita

Arctostaphylos tomentosa	Santa Cruz Island Manzanita	
Arctostaphylos tomentosa	woollyleaf manzanita	
Arctostaphylos uva-ursi	kinnikinnick	
Arctostaphylos virgata	Bolinas manzanita	
Arctostaphylos viridissima	whitehair manzanita	
Arctostaphylos viscida	Mariposa manzanita	
Arctostaphylos viscida	sticky whiteleaf manzanita	
Arctostaphylos wellsii	Wells' manzanita	
Arctotheca	Capeweed	Common
Arctotheca calendula	Capeweed	Common
Arctotheca spp.	(capeweeds, cape dandelion)	Common
Arctotis	arctotis	Common
Arctotis spp.	(African daisy)	Common
Arctotis stoechadifolia	African daisy	Common
Aronia melanocarpa	Chokeberry	
Artemisia	sagebrush	Common
Artemisia annua	sweet sagewort	Common
Artemisia arbuscula	little sagebrush	Common
Artemisia arctica	boreal sagebrush	Common
Artemisia biennis	biennial wormwood	Common
Artemisia bigelovii	Bigelow sage	Common
Artemisia californica	coastal sagebrush	Common
Artemisia campestris	field sagewort	Common
Artemisia campestris	field sagewort	Common
Artemisia campestris	field sagewort	Common
Artemisia cana	silver sagebrush	Common
Artemisia douglasiana	Douglas' sagewort	Common
Artemisia dracunculus	tarragon	Common
Artemisia lindleyana	Columbia River wormwood	Common
Artemisia ludoviciana	white sagebrush	Common
Artemisia ludoviciana	white sagebrush	Common
Artemisia michauxiana	Michaux's wormwood	Common
Artemisia nesiotica	island sagebrush	Common
Artemisia norvegica		Common
Artemisia nova	black sagebrush	Common
Artemisia palmeri	San Diego sagewort	Common
Artemisia pycnocephala	beach wormwood	Common
Artemisia rothrockii	timberline sagebrush	Common
Artemisia spinescens		Common
Artemisia spp.		Common
Artemisia suksdorfii	coastal wormwood	Common
Artemisia tridentata	basin big sagebrush	Common
Artemisia tridentata	big sagebrush	Common
Artemisia tridentata	mountain big sagebrush	Common
Artemisia tridentata	Wyoming big sagebrush	Common
Artemisia vulgaris	common wormwood	Common
Asparagus	asparagus	Occasional
Asparagus asparagoides	African asparagus fern	Occasional
Asparagus densiflorus	Sprenger's asparagus fern	Occasional
Asparagus officinalis	garden asparagus	Occasional
Asparagus setaceus	common asparagus fern	Occasional

Asparagus spp.	(asparagus, asparagus fern, smilax asparagus)	Occasional
Astartea spp.		
Aster intricatus		Common
Aster spp.	(asters)	Common
Athyrium	ladyfern	
Athyrium americanum	alpine ladyfern	
Athyrium distentifolium		
Athyrium filix'femina	Lady Fern	
Athyrium filix-femina	common ladyfern	
Athyrium filix-femina	subarctic ladyfern	
Aucuba spp.	(aucuba, Himalaya laurel, Japanese laurel)	Occasional
Azara microphylla	Boxleaf Azara	
Baccharis	baccharis	Common
Baccharis brachyphylla	shortleaf baccharis	Common
Baccharis douglasii	saltmarsh baccharis	Common
Baccharis emoryi	Emory's baccharis	Common
Baccharis glutinosa		Common
Baccharis malibuensis	Malibu baccharis	Common
Baccharis pilularis	coyotebrush	Common
Baccharis plummerae	Plummer's baccharis	Common
Baccharis plummerae	smooth baccharis	Common
Baccharis salicifolia	mule's fat	Common
Baccharis sarothroides	desertbroom	Common
Baccharis sergiloides	desert baccharis	Common
Baccharis spp.	(coyote brush, desert broom)	Common
Baccharis vanessae	Encinitis false willow	Common
Banksia spp.	(candle flowers)	Common
Begonia spp.	(begonia)	Occasional
Berberis	barberry	Occasional
Berberis aquifolium		Occasional
Berberis darwinii	Darwin's berberis	Occasional
Berberis fremontii		Occasional
Berberis haematocarpa		Occasional
Berberis nervosa		Occasional
Berberis nevinii		Occasional
Berberis pinnata		Occasional
Berberis pumila		Occasional
Berberis repens		Occasional
Berberis spp.	(barberry)	Occasional
Beta	beet	Occasional
Beta spp.	(beet)	Occasional
Beta vulgaris	common beet	Occasional
Betula	birch	Occasional
Betula glandulosa	resin birch	Occasional
Betula jacquemontii	Birch	Occasional
Betula nana	dwarf birch	Occasional
Betula occidentalis	water birch	Occasional
Betula pumila	bog birch	Occasional
Betula pumila	bog birch	Occasional
Betula spp.	(birch)	Occasional
Blandfordia spp.	(Christmas bells)	

Boronia spp.	(boronias)	Common
Brassica	mustard	Occasional
Brassica fruticulosa	Mediterranean cabbage	Occasional
Brassica juncea	India mustard	Occasional
Brassica napus	rape	Occasional
Brassica nigra	black mustard	Occasional
Brassica oleracea	cabbage	Occasional
Brassica rapa	field mustard	Occasional
Brassica spp.	(broccoli, cauliflower, cabbage, cress, kale, mustard, etc.)	Occasional
Brassica tournefortii	Asian mustard	Occasional
Breynia spp.	(snow bush)	Occasional
Bromus	brome	Occasional
Bromus alopecuros	weedy brome	Occasional
Bromus anomalus		Occasional
Bromus arenarius	Australian brome	Occasional
Bromus arizonicus	Arizona brome	Occasional
Bromus arvensis	field brome	Occasional
Bromus berteroanus	Chilean chess	Occasional
Bromus briziformis	rattlesnake brome	Occasional
Bromus carinatus	California brome	Occasional
Bromus catharticus	rescuegrass	Occasional
Bromus ciliatus	fringed brome	Occasional
Bromus ciliatus	fringed brome	Occasional
Bromus diandrus	ripgut brome	Occasional
Bromus erectus	erect brome	Occasional
Bromus grandis	tall brome	Occasional
Bromus hordeaceus	soft brome	Occasional
Bromus inermis	smooth brome	Occasional
Bromus laevipes	Chinook brome	Occasional
Bromus marginatus	mountain brome	Occasional
Bromus maritimus	seaside brome	Occasional
Bromus matritensis	compact brome	Occasional
Bromus orcuttianus	Orcutt's brome	Occasional
Bromus pacificus		Occasional
Bromus polyanthus	Great Basin brome	Occasional
Bromus porteri	Porter brome	Occasional
Bromus pseudolaevipes	coast range brome	Occasional
Bromus racemosus	bald brome	Occasional
Bromus richardsonii		Occasional
Bromus rubens	red brome	Occasional
Bromus scoparius	broom brome	Occasional
Bromus secalinus		Occasional
Bromus secalinus	rye brome	Occasional
Bromus sitchensis	Alaska brome	Occasional
Bromus spp.	(brome, bromegrass, chess, foxtail, rescuegrass)	Occasional
Bromus stamineus	roadside brome	Occasional
Bromus sterilis	poverty brome	Occasional
Bromus subvelutinus	hoary brome	Occasional
Bromus suksdorfii	Suksdorf's brome	Occasional
Bromus tectorum	cheatgrass	Occasional

Bromus vulgaris	Columbia brome	Occasional
Buddleia spp.	(butterfly bush)	
Buddleja	butterflybush	Common
Buddleja davidii	orange eye butterflybush	Common
Buddleja saligna	squarestem butterflybush	Common
Buddleja utahensis	Utah butterflybush	Common
Bursaria spp.	(black thorns, prickly box)	
Calendula	marigold	Common
Calendula arvensis	field marigold	Common
Calendula officinalis	pot marigold	Common
Calendula spp.	(calendula, marigold)	Common
Callistemon spp.		Occasional
Camellia spp.	(camellia)	Occasional
Campsis	campsis	Occasional
Campsis radicans	trumpet creeper	Occasional
Campsis spp.	(trumpet creeper, trumpet vine)	Occasional
Capsella	capsella	Occasional
Capsella bursa-pastoris	shepherd's purse	Occasional
Capsella spp.	(shepard's purse)	Occasional
Capsicum	pepper	Occasional
Capsicum annuum	cayenne pepper	Occasional
Capsicum spp.	Pepper	Occasional
Carduus	plumeless thistle	Common
Carduus acanthoides	spiny plumeless thistle	Common
Carduus nutans	nodding plumeless thistle	Common
Carduus pycnocephalus	Italian plumeless thistle	Common
Carduus spp.		Common
Carduus tenuiflorus	winged plumeless thistle	Common
Carmichaelia spp.		Very Common
Carpobrotus	carpobrotus	
Carpobrotus chilensis	sea fig	
Carpobrotus edulis	hottentot fig	
Carpobrotus spp.		
Cassia spp.	(golden shower, pink shower, rainbow shower, gold medallion tree)	Very Common
Ceanothus	ceanothus	Occasional
Ceanothus ×arcuatus		Occasional
Ceanothus ×bakeri		Occasional
Ceanothus ×flexilis	flexible ceanothus	Occasional
Ceanothus ×lobbianus		Occasional
Ceanothus ×lorenzenii		Occasional
Ceanothus ×mendocinensis	Mendocino ceanothus	Occasional
Ceanothus ×otayensis		Occasional
Ceanothus ×rugosus		Occasional
Ceanothus ×serrulatus	Cascade Lake ceanothus	Occasional
Ceanothus ×vanrensselaeri		Occasional
Ceanothus ×veitchianus		Occasional
Ceanothus arboreus	feltleaf ceanothus	Occasional
Ceanothus confusus	Rincon Ridge ceanothus	Occasional
Ceanothus connivens	trailing buckbrush	Occasional
Ceanothus cordulatus	whitethorn ceanothus	Occasional

Ceanothus crassifolius	hoaryleaf ceanothus	Occasional
Ceanothus cuneatus	buckbrush	Occasional
Ceanothus cuneatus	Monterey ceanothus	Occasional
Ceanothus cuneatus	sedgeleaf buckbrush	Occasional
Ceanothus cyaneus	San Diego buckbrush	Occasional
Ceanothus dentatus	sandscrub ceanothus	Occasional
Ceanothus divergens	Calistoga ceanothus	Occasional
Ceanothus diversifolius	pinemat	Occasional
Ceanothus ferrisiae	Coyote ceanothus	Occasional
Ceanothus foliosus	Vine Hill ceanothus	Occasional
Ceanothus foliosus	wavyleaf buckbrush	Occasional
Ceanothus foliosus	wavyleaf ceanothus	Occasional
Ceanothus fresnensis	Fresno mat	Occasional
Ceanothus gloriosus	Mt. Vision ceanothus	Occasional
Ceanothus gloriosus	Point Reyes ceanothus	Occasional
Ceanothus greggii	desert ceanothus	Occasional
Ceanothus greggii	Mojave ceanothus	Occasional
Ceanothus griseus	Carmel ceanothus	Occasional
Ceanothus hearstiorum	Hearst Ranch buckbrush	Occasional
Ceanothus impressus	Santa Barbara ceanothus	Occasional
Ceanothus incanus	coast whitethorn	Occasional
Ceanothus integerrimus	deerbrush	Occasional
Ceanothus jepsonii	Jepson ceanothus	Occasional
Ceanothus lemmonii	Lemmon's ceanothus	Occasional
Ceanothus leucodermis	chaparral whitethorn	Occasional
Ceanothus maritimus	maritime ceanothus	Occasional
Ceanothus masonii	Mason's ceanothus	Occasional
Ceanothus megacarpus	bigpod ceanothus	Occasional
Ceanothus megacarpus	island ceanothus	Occasional
Ceanothus oliganthus	hairy ceanothus	Occasional
Ceanothus ophiochilus	Vail Lake ceanothus	Occasional
Ceanothus palmeri	Palmer ceanothus	Occasional
Ceanothus papillosus	wartleaf ceanothus	Occasional
Ceanothus parryi	Parry ceanothus	Occasional
Ceanothus parvifolius	littleleaf ceanothus	Occasional
Ceanothus pinetorum	Coville ceanothus	Occasional
Ceanothus prostratus	prostrate ceanothus	Occasional
Ceanothus pumilus	dwarf ceanothus	Occasional
Ceanothus purpureus	hollyleaf ceanothus	Occasional
Ceanothus roderickii	Pine Hill buckbrush	Occasional
Ceanothus sanguineus	redstem ceanothus	Occasional
Ceanothus sonomensis	Sonoma ceanothus	Occasional
Ceanothus sorediatus	jimbrush	Occasional
Ceanothus spinosus	redheart	Occasional
Ceanothus spp.	(buck brush, wild lilac)	Occasional
Ceanothus thyrsiflorus	blueblossom	Occasional
Ceanothus tomentosus	woolyleaf ceanothus	Occasional
Ceanothus velutinus	Hooker's ceanothus	Occasional
Ceanothus velutinus	snowbrush ceanothus	Occasional
Ceanothus verrucosus	barranca brush	Occasional
Cedrus spp.	(cedar)	

Centranthus	centranthus	Occasional
Centranthus ruber	red valerian	Occasional
Ceratostigma spp.	(Chinese plumbago)	Occasional
Cestrum	jessamine	
Cestrum elegans	Cestrum	
Cestrum fasciculatum	early jessamine	
Cestrum nocturnum	night jessamine	
Cestrum parqui	Chilean jessamine	
Chaenomeles spp.	Flowering Quince	Very Common
Chamaecyparis	cedar	Occasional
Chamaecyparis lawsoniana	Port Orford cedar	Occasional
Chamaecyparis spp.	(false cypress, Port Orford cedar)	Occasional
Chenopodium	goosefoot	Occasional
Chenopodium album	lambsquarters	Occasional
Chenopodium album	lateflowering goosefoot	Occasional
Chenopodium album	Missouri lambsquarters	Occasional
Chenopodium album	Stevens' lambsquarters	Occasional
Chenopodium ambrosioides	Mexican tea	Occasional
Chenopodium atrovirens	pinyon goosefoot	Occasional
Chenopodium berlandieri	pitseed goosefoot	Occasional
Chenopodium berlandieri	pitseed goosefoot	Occasional
Chenopodium berlandieri	Zschack's goosefoot	Occasional
Chenopodium botrys	Jerusalem oak goosefoot	Occasional
Chenopodium californicum	California goosefoot	Occasional
Chenopodium capitatum	blite goosefoot	Occasional
Chenopodium carnosulum	ridged goosefoot	Occasional
Chenopodium chenopodioides	low goosefoot	Occasional
Chenopodium desiccatum	aridland goosefoot	Occasional
Chenopodium foliosum	leafy goosefoot	Occasional
Chenopodium fremontii	Fremont's goosefoot	Occasional
Chenopodium hians	hians goosefoot	Occasional
Chenopodium humile	marshland goosefoot	Occasional
Chenopodium incanum	mealy goosefoot	Occasional
Chenopodium leptophyllum	narrowleaf goosefoot	Occasional
Chenopodium macrospermum	largeseed goosefoot	Occasional
Chenopodium macrospermum	saltloving goosefoot	Occasional
Chenopodium multifidum	cutleaf goosefoot	Occasional
Chenopodium murale	nettleleaf goosefoot	Occasional
Chenopodium nevadense	Nevada goosefoot	Occasional
Chenopodium opulifolium	seaport goosefoot	Occasional
Chenopodium overi	Over's goosefoot	Occasional
Chenopodium polyspermum	manyseed goosefoot	Occasional
Chenopodium pratericola	desert goosefoot	Occasional
Chenopodium pumilio	clammy goosefoot	Occasional
Chenopodium rubrum	red goosefoot	Occasional
Chenopodium salinum	Rocky Mountain goosefoot	Occasional
Chenopodium simplex	mapleleaf goosefoot	Occasional
Chenopodium spp.	(fat-hen, lamb's quarters)	Occasional
Chenopodium vulvaria	stinking goosefoot	Occasional
Chenopodium watsonii	Watson's goosefoot	Occasional
Chimonanthus spp.	(Japanese allspice, wintersweet)	Occasional

Choisya spp.	(Mexican orange)	Common
Choisya ternata	Mexican Orange	Common
Chrysanthemum	daisy	Common
Chrysanthemum ×morifolium	florist's daisy	Common
Chrysanthemum maxium	Shasta Daisy	Common
Chrysanthemum spp.	(chrysanthemums)	Common
Chrysanthemum x	morifolium (florist mums)	Common
Cirsium	thistle	Common
Cirsium andersonii	rose thistle	Common
Cirsium andrewsii	Franciscan thistle	Common
Cirsium arizonicum	Arizona thistle	Common
Cirsium arvense	Canada thistle	Common
Cirsium brevistylum	clustered thistle	Common
Cirsium canescens		Common
Cirsium canovirens	graygreen thistle	Common
Cirsium ciliolatum	Ashland thistle	Common
Cirsium crassicaule	slough thistle	Common
Cirsium cymosum	peregrine thistle	Common
Cirsium douglasii	Douglas' thistle	Common
Cirsium fontinale	Chorro Creek Bog thistle	Common
Cirsium fontinale	fountain thistle	Common
Cirsium fontinale	Mt Hamilton thistle	Common
Cirsium hydrophilum	Suisun thistle	Common
Cirsium hydrophilum	Suisun thistle	Common
Cirsium hydrophilum	Vasey's thistle	Common
Cirsium inamoenum		Common
Cirsium loncholepis	la graciosa thistle	Common
Cirsium mohavense	Mojave thistle	Common
Cirsium neomexicanum	New Mexico thistle	Common
Cirsium occidentale	cobwebby thistle	Common
Cirsium occidentale	compact cobwebby thistle	Common
Cirsium occidentale	snowy thistle	Common
Cirsium ochrocentrum	yellowspine thistle	Common
Cirsium praeteriens	Palo Alto thistle	Common
Cirsium quercetorum	Alameda County thistle	Common
Cirsium remotifolium	fewleaf thistle	Common
Cirsium rhothophilum	surf thistle	Common
Cirsium scabrum	rough thistle	Common
Cirsium scariosum	meadow thistle	Common
Cirsium spp.	(Arizona thistle, bull thistle, Canada thistle)	Common
Cirsium subniveum	Jackson Hole thistle	Common
Cirsium undulatum	wavyleaf thistle	Common
Cirsium vulgare	bull thistle	Common
Citrus Limon	Lemon	Common
Citrus paradisiaca	Grapfruit	Common
Citrus sinensis	Washington Navel	Common
Citrus spp.	Citrus	Common
Clematis	leather flower	Common
Clematis drummondii		Common
Clematis lasiantha	pipestem clematis	Common
Clematis ligusticifolia	California clematis	Common

Clematis ligusticifolia	western white clematis	Common
Clematis pauciflora	ropevine clematis	Common
Clematis spp.	(clematis, virgin's bower, lather flower, vase vine)	Common
Clematis terniflora	sweet autumn virginsbower	Common
Clematis vitalba	evergreen clematis	Common
Clerodendron spp.		
Clethra spp.	(white alder, summer-sweet)	Occasional
Clianthus spp.	(desert pea, glory pea, parrot's-beak)	Very Common
Convolvulus	bindweed	Occasional
Convolvulus althaeoides	mallow bindweed	Occasional
Convolvulus arvensis	field bindweed	Occasional
Convolvulus equitans	Texas bindweed	Occasional
Convolvulus spp.	(field bindweed, dwarf morning-glory)	Occasional
Convolvulus tricolor	dwarf morning-glory	Occasional
Conyza	horseweed	Common
Conyza bonariensis	asthmaweed	Common
Conyza canadensis	Canadian horseweed	Common
Conyza floribunda	asthmaweed	Common
Conyza spp.	(fleabane, horsethistle)	Common
Coprosma	mirrorplant	
Coprosma repens	creeping mirrorplant	
Coprosma spp.		
Cordyline	cordyline	Occasional
Cordyline australis	cabbage tree	Occasional
Cordyline spp.	(cabbage tree, dracaena, good-luck plant)	Occasional
Coriaria spp.	(tanner's tree)	Occasional
Cornus	dogwood	
Cornus canadensis		
Cornus glabrata	brown dogwood	
Cornus nuttallii	Pacific dogwood	
Cornus sericea	redosier dogwood	
Cornus sericea	western dogwood	
Cornus sessilis	blackfruit dogwood	
Cornus unalaschkensis	western cordilleran bunchberry	
Correa spp.	Carmine Bells	Common
Cotoneaster	cotoneaster	Very Common
Cotoneaster franchetii	orange cotoneaster	Very Common
Cotoneaster lacteus	milkflower cotoneaster	Very Common
Cotoneaster pannosus	silverleaf cotoneaster	Very Common
Cotoneaster spp.	Cotoneaster	Very Common
Crataegus	hawthorn	Very Common
Crataegus douglasii	black hawthorn	Very Common
Crataegus monogyna	oneseed hawthorn	Very Common
Crataegus spp.	(hawthorn)	Very Common
Crataegus suksdorfii	Suksdorf's hawthorn	Very Common
Crocosmia	crocosmia	Common
Crocosmia ×crocosmiiflora	montbretia	Common
Crocosmia spp.	(montbretia)	Common
Cryptomeria spp.	(Japanese cedar)	
Cryptostemma spp.	(capeweed)	Common

Cucumis	melon	
Cucumis anguria	West Indian gherkin	
Cucumis melo	cantaloupe	
Cucumis myriocarpus	gooseberry gourd	
Cucumis spp.	(cantaloupe, cucumber, melon, muskmelon)	
Cucurbita	gourd	Occasional
Cucurbita digitata	fingerleaf gourd	Occasional
Cucurbita ficifolia	figleaf gourd	Occasional
Cucurbita foetidissima	Missouri gourd	Occasional
Cucurbita palmata	coyote gourd	Occasional
Cucurbita pepo	field pumpkin	Occasional
Cucurbita pepo		Occasional
Cucurbita spp.	(gourds, pumpkins, squashes)	Occasional
Cupressus	cypress	Occasional
Cupressus abramsiana	Santa Cruz Island cypress	Occasional
Cupressus arizonica	Arizona cypress	Occasional
Cupressus arizonica	Arizona cypress	Occasional
Cupressus arizonica	Cuyamaca cypress	Occasional
Cupressus arizonica	Paiute cypress	Occasional
Cupressus bakeri	Modoc cypress	Occasional
Cupressus forbesii	tecate cypress	Occasional
Cupressus goveniana	Gowen cypress	Occasional
Cupressus goveniana	Gowen cypress	Occasional
Cupressus goveniana	pygmy cypress	Occasional
Cupressus guadalupensis		Occasional
Cupressus macnabiana	MacNab's cypress	Occasional
Cupressus macrocarpa	Monterey cypress	Occasional
Cupressus nootkatensis	Alaska cedar	Occasional
Cupressus sargentii	Sargent's cypress	Occasional
Cupressus spp.	(cypress)	Occasional
Cydonia	cydonia	Very Common
Cydonia oblonga	quince	Very Common
Cydonia spp.	(quince)	Very Common
Cyphomandra spp.	(tamarillo, tree tomato, tomato tree)	
Cytisus	broom	Very Common
Cytisus ×dallimorei		Very Common
Cytisus multiflorus	white spanishbroom	Very Common
Cytisus scoparius	Scotch broom	Very Common
Cytisus spp.	(genista, Scotch broom, Spanish broom, white Spanish)	Very Common
Cytisus striatus	striated broom	Very Common
Dahlia spp.	(dahlia)	Common
Datura	jimsonweed	Occasional
Datura discolor	desert thorn-apple	Occasional
Datura inoxia	pricklyburr	Occasional
Datura quercifolia	Chinese thorn-apple	Occasional
Datura spp.	(angel's trumpet, Jimson weed, thorn apple)	Occasional
Datura stramonium	jimsonweed	Occasional
Datura wrightii	sacred thorn-apple	Occasional
Daucus	wild carrot	Occasional
Daucus carota	Queen Anne's lace	Occasional

Daucus pusillus	American wild carrot	Occasional
Daucus spp.	(carrot, Queen Anne's lace)	Occasional
Dendromecon	tree poppy	
Dendromecon californica	Bush Poppy	
Dendromecon harfordii	Harford's tree poppy	
Dendromecon rigida	tree poppy	
Deutzia spp.	Deutzia	Occasional
Diospyros	diospyros	Occasional
Diospyros spp.	(ebony, persimmon)	Occasional
Diospyros virginiana	common persimmon	Occasional
Dodonaea	dodonaea	Occasional
Dodonaea spp.	((hop bush, hopseed bush)	Occasional
Dodonaea viscosa	Florida hopbush	Occasional
Duchesnea	duchesnea	Very Common
Duchesnea indica	Indian strawberry	Very Common
Elaeagnus	elaeagnus	
Elaeagnus angustifolia	Russian olive	
Elaeagnus pungens	Silberberry	
Epilobium	willowherb	
Epilobium anagallidifolium	pimpernel willowherb	
Epilobium brachycarpum	tall annual willowherb	
Epilobium canum	hummingbird trumpet	
Epilobium ciliatum	fringed willowherb	
Epilobium ciliatum	fringed willowherb	
Epilobium ciliatum	fringed willowherb	
Epilobium clavatum	talus willowherb	
Epilobium cleistogamum	selfing willowherb	
Epilobium densiflorum	denseflower willowherb	
Epilobium foliosum	California willowherb	
Epilobium glaberrimum	glaucus willowherb	
Epilobium halleanum	glandular willowherb	
Epilobium hornemannii	Hornemann's willowherb	
Epilobium hornemannii	Hornemann's willowherb	
Epilobium howellii	Yuba Pass willowherb	
Epilobium lactiflorum	milkflower willowherb	
Epilobium leptophyllum	bog willowherb	
Epilobium luteum	yellow willowherb	
Epilobium minutum	chaparral willowherb	
Epilobium nivium	Snow Mountain willowherb	
Epilobium obcordatum	rockfringe	
Epilobium oreganum	Grants Pass willowherb	
Epilobium oregonense	Oregon willowherb	
Epilobium pallidum	largeflower spike-primrose	
Epilobium palustre	marsh willowherb	
Epilobium pygmaeum	smooth spike-primrose	
Epilobium rigidum	stiff willowherb	
Epilobium saximontanum	Rocky Mountain willowherb	
Epilobium septentrionale	northern willowherb	
Epilobium siskiyouense	Siskiyou willowherb	
Epilobium spp.	(fireweed)	
Epilobium torreyi	Torrey's willowherb	

Erica	heath	Common
Erica lusitanica	Spanish heath	Common
Erica spp.	(heath, heather)	Common
Eriobotrya	loquat	Very Common
Eriobotrya japonica	loquat	Very Common
Eriobotrya spp.	(loquat)	Very Common
Eriostemon spp.	(pink star, wax flower)	Common
Erodium	stork's bill	Occasional
Erodium botrys	longbeak stork's bill	Occasional
Erodium brachycarpum	shortfruit stork's bill	Occasional
Erodium cicutarium	redstem stork's bill	Occasional
Erodium cygnorum	Australian stork's bill	Occasional
Erodium macrophyllum	California stork's bill	Occasional
Erodium macrophyllum	roundleaf stork's bill	Occasional
Erodium malacoides	Mediterranean stork's bill	Occasional
Erodium moschatum	musky stork's bill	Occasional
Erodium spp.	(cranesbill, filaree)	Occasional
Erodium texanum	Texas stork's bill	Occasional
Escallonia	redclaws	Occasional
Escallonia compacta	Escallonia	Occasional
Escallonia rubra	redclaws	Occasional
Escallonia spp.		Occasional
Eucalyptus	gum	Primary
Eucalyptus ×mortoniana		Primary
Eucalyptus camaldulensis	river redgum	Primary
Eucalyptus cladocalyx	sugargum	Primary
Eucalyptus globulus	Tasmanian bluegum	Primary
Eucalyptus polyanthemos	redbox	Primary
Eucalyptus pulverulenta	silverleaf mountain gum	Primary
Eucalyptus sideroxylon	red ironbark	Primary
Eucalyptus spp.	(eucalyptus, gum trees)	Primary
Eucalyptus tereticornis	forest redgum	Primary
Eucalyptus torquata	coral gum	Primary
Eucalyptus viminalis	manna gum	Primary
Eugenia	stopper	Occasional
Eugenia apiculata	shortleaf stopper	Occasional
Eugenia spp.	(cherry of the Rio Grande, Lilly Pilly, Surinam cherry)	Occasional
Euonymus	spindletree	Occasional
Euonymus occidentale	western burning bush	Occasional
Euonymus occidentalis		Occasional
Euonymus spp.	(euonymus, spindle tree)	Occasional
Euphorbia	spurge	
Euphorbia characias	Albanian spurge	
Euphorbia crenulata	Chinese caps	
Euphorbia cyathophora	fire on the mountain	
Euphorbia cyparissias	cypress spurge	
Euphorbia davidii	David's spurge	
Euphorbia dendroides	tree spurge	
Euphorbia dentata	toothed spurge	
Euphorbia eriantha	beetle spurge	

Euphorbia esula	leafy spurge	
Euphorbia exigua	dwarf spurge	
Euphorbia exstipulata	squareseed spurge	
Euphorbia helioscopia	madwoman's milk	
Euphorbia heterophylla	Mexican fireplant	
Euphorbia lathyris	moleplant	
Euphorbia marginata	snow on the mountain	
Euphorbia misera	cliff spurge	
Euphorbia myrsinites	myrtle spurge	
Euphorbia oblongata	eggleaf spurge	
Euphorbia palmeri	woodland spurge	
Euphorbia peplus	petty spurge	
Euphorbia rigida	upright myrtle spurge	
Euphorbia schizoloba	Mojave spurge	
Euphorbia serrata	serrate spurge	
Euphorbia spathulata	warty spurge	
Euphorbia spp.	(euphorbia, spurges)	
Euphorbia terracina	Geraldton carnation weed	
Euphorbia tirucalli	Indiantree spurge	
Fagus spp.	(beech)	Occasional
Feijoa sellowiana	Pineapple Guava	Primary
Feijoa spp.	(feijoa, pineapple guava)	Primary
Ficus	fig	Occasional
Ficus carica	edible fig	Occasional
Ficus palmata	Punjab fig	Occasional
Ficus rubiginosa	Port Jackson fig	Occasional
Ficus spp.	Climbing Fig	Occasional
Forsythia spp.	(forsythias)	Occasional
Fortunella	kumquat	Common
Fortunella japonica	round kumquat	Common
Fortunella spp.	(kumquats)	Common
Fragaria	strawberry	Very Common
Fragaria ×ananassa		Very Common
Fragaria ×bringhurstii		Very Common
Fragaria chiloensis	beach strawberry	Very Common
Fragaria chiloensis	Pacific beach strawberry	Very Common
Fragaria spp.	(strawberry)	Very Common
Fragaria vesca	California strawberry	Very Common
Fragaria vesca	woodland strawberry	Very Common
Fragaria virginiana	Virginia strawberry	Very Common
Fraxinus	ash	
Fraxinus anomala	singleleaf ash	
Fraxinus dipetala	California ash	
Fraxinus latifolia	Oregon ash	
Fraxinus spp.	(ash)	
Fraxinus uhdei	shamel ash	
Fraxinus velutina	velvet ash	
Fuchsia	fuchsia	Occasional
Fuchsia boliviana	Bolivian fuchsia	Occasional
Fuchsia hybrida	hybrid fuchsia	Occasional
Fuchsia magellanica	hardy fuchsia	Occasional

Fuchsia paniculata	shrubby fuchsia	Occasional
Fuchsia spp.	Fuchsia	Occasional
Fumaria	fumitory	
Fumaria capreolata	white ramping fumitory	
Fumaria officinalis	drug fumitory	
Fumaria parviflora	fineleaf fumitory	
Fumaria spp.	(fumitory)	
Garrya	silktassel	Occasional
Garrya buxifolia	dwarf silktassel	Occasional
Garrya congdonii	chaparral silktassel	Occasional
Garrya elliptica	wavyleaf silktassel	Occasional
Garrya flavescens	ashy silktassel	Occasional
Garrya fremontii	bearbrush	Occasional
Garrya spp.	(silk-tassel)	Occasional
Garrya veatchii	canyon silktassel	Occasional
Gelsemium spp.	(Carolina jessamine)	Occasional
Genista	broom	Very Common
Genista aetnensis	Mt. Etna broom	Very Common
Genista canariensis	Canary broom	Very Common
Genista linifolia	Mediterranean broom	Very Common
Genista maderensis	Madeira Dyer's greenweed	Very Common
Genista monspessulana	French broom	Very Common
Genista spp.	(brooms)	Very Common
Genista stenopetala	leafy broom	Very Common
Geranium	geranium	Occasional
Geranium bicknellii	Bicknell's cranesbill	Occasional
Geranium californicum	California cranesbill	Occasional
Geranium carolinianum	Carolina geranium	Occasional
Geranium carolinianum	Carolina geranium	Occasional
Geranium carolinianum	Carolina geranium	Occasional
Geranium columbinum	longstalk cranesbill	Occasional
Geranium dissectum	cutleaf geranium	Occasional
Geranium homeanum	Australasian geranium	Occasional
Geranium lucidum	shining geranium	Occasional
Geranium molle	dovefoot geranium	Occasional
Geranium nervosum		Occasional
Geranium oreganum	Oregon geranium	Occasional
Geranium palmatum	Canary Island geranium	Occasional
Geranium potentilloides	cinquefoil geranium	Occasional
Geranium pusillum	small geranium	Occasional
Geranium pyrenaicum	hedgerow geranium	Occasional
Geranium retrorsum	New Zealand geranium	Occasional
Geranium richardsonii	Richardson's geranium	Occasional
Geranium robertianum		Occasional
Geranium robertianum	Robert geranium	Occasional
Geranium robertianum	Robert geranium	Occasional
Geranium rotundifolium	roundleaf geranium	Occasional
Geranium sibiricum	Siberian geranium	Occasional
Geranium solanderi	Solander's geranium	Occasional
Geranium spp.	(cranesbill)	Occasional
Geranium texanum	Texas geranium	Occasional

Geranium viscosissimum	sticky purple geranium	Occasional
Gerbera spp.	(Transvaal daisy)	Common
Gomphocarpus spp.	(cotton bush, hairy balls, wild cotton)	Occasional
Grevillea spp.	(hummingbird bush, grevilleas, silky-oak)	Occasional
Gypsophila	baby's-breath	
Gypsophila elegans	showy baby's-breath	
Gypsophila paniculata	baby's breath	
Gypsophila scorzonerifolia	garden baby's-breath	
Gypsophila spp.	(baby's-breath)	
Hakea spp.	(pincushion tree)	Occasional
Haloragis	seaberry	Occasional
Haloragis erecta	erect seaberry	Occasional
Haloragis spp.	(erect seaberry, seaberry)	Occasional
Hardenbergia spp.	(coral pea, lilac vine)Hebe spp. (hebe)	Very Common
Hebe	hebe	Occasional
Hebe ×franciscana		Occasional
Hebe speciosa	New Zealand hebe	Occasional
Hedera	ivy	Occasional
Hedera canariensis	Canary ivy	Occasional
Hedera helix	English ivy	Occasional
Hedera spp.	(ivy)	Occasional
Helianthus	sunflower	Common
Helianthus annuus	common sunflower	Common
Helianthus bolanderi	serpentine sunflower	Common
Helianthus californicus	California sunflower	Common
Helianthus ciliaris	Texas blueweed	Common
Helianthus cusickii	Cusick's sunflower	Common
Helianthus gracilentus	slender sunflower	Common
Helianthus maximiliani	Maximilian sunflower	Common
Helianthus niveus	Algodones sunflower	Common
Helianthus niveus	showy sunflower	Common
Helianthus nuttallii	Nuttall's sunflower	Common
Helianthus nuttallii	Parish's sunflower	Common
Helianthus petiolaris	prairie sunflower	Common
Helianthus spp.	(Jerusalem artichoke, sunflower)	Common
Helianthus tuberosus	Jerusalem artichoke	Common
Helichrysum	strawflower	Common
Helichrysum petiolare	licorice-plant	Common
Helichrysum spp.	(curry plant, licorice plant, straw flower)	Common
Heteromeles	toyon	
Heteromeles arbutifolia		
Heteromeles salicifolia		
Hibiscus	rosemallow	
Hibiscus denudatus	paleface	
Hibiscus lasiocarpos	rosemallow	
Hibiscus spp.	Hibiscus	
Hibiscus syriacus	Hibiscus	
Hibiscus trionum	flower of an hour	
Hoheria		Occasional
Hoheria populnea	lacebark	Occasional
Hoheria spp.	(lacebark)	Occasional

Holcus	velvetgrass	Occasional
Holcus lanatus	common velvetgrass	Occasional
Holcus mollis	creeping velvetgrass	Occasional
Holcus spp.	(velvet grass)	Occasional
Humulus	hop	Primary
Humulus lupulus	common hop	Primary
Humulus spp.	(hops)	Primary
Hydrangea quercifolia	Oak Leaf Hydrangea	
Hypericum	St. Johnswort	Common
Hypericum anagalloides	tinker's penny	Common
Hypericum androsaemum	sweet-amber	Common
Hypericum calycinum	Aaron's beard	Common
Hypericum canariense	Canary Island St. Johnswort	Common
Hypericum concinnum	goldwire	Common
Hypericum hookerianum	Hooker's St. Johnswort	Common
Hypericum mutilum	dwarf St. Johnswort	Common
Hypericum perforatum	common St. Johnswort	Common
Hypericum scouleri	Scouler's St. Johnswort	Common
Hypericum spp.	(Aaron's beard, sweet-amber, St John's wort)	Common
Ilex	holly	Occasional
Ilex ×attenuata	topal holly	Occasional
Ilex aquifolium	English holly	Occasional
Ilex spp.	(holly)	Occasional
Iris	iris	Occasional
Iris bracteata	Siskiyou iris	Occasional
Iris chrysophylla	yellowleaf iris	Occasional
Iris douglasiana	Douglas iris	Occasional
Iris fernaldii	Fernald's iris	Occasional
Iris foetidissima	stinking iris	Occasional
Iris germanica	German iris	Occasional
Iris hartwegii	rainbow iris	Occasional
Iris innominata	Del Norte County iris	Occasional
Iris longipetala		Occasional
Iris macrosiphon	bowltube iris	Occasional
Iris missouriensis	Rocky Mountain iris	Occasional
Iris munzii	Munz's iris	Occasional
Iris orientalis	yellowband iris	Occasional
Iris pseudacorus	paleyellow iris	Occasional
Iris purdyi	Purdy's iris	Occasional
Iris sibirica	Siberian iris	Occasional
Iris spp.	(iris)	Occasional
Iris spuria	seashore iris	Occasional
Iris tenax	Klamath iris	Occasional
Iris tenax	toughleaf iris	Occasional
Iris tenuissima	longtube iris	Occasional
Iris thompsonii	Thompson's iris	Occasional
Jasminum spp.	(jasmine)	Occasional
Juglans	walnut	Occasional
Juglans californica	Southern California walnut	Occasional
Juglans hindsii	Northern California walnut	Occasional
Juglans regia	English walnut	Occasional

Juglans spp.	(California black walnut, butternut, English walnut)	Occasional
Juncus	rush	
Juncus acuminatus	tapertip rush	
Juncus acutus	Leopold's rush	
Juncus acutus	spiny rush	
Juncus ambiguus	seasice rush	
Juncus arcticus	Baltic rush	
Juncus articulatus	jointleaf rush	
Juncus balticus		
Juncus bolanderi	Bolander's rush	
Juncus brachyphyllus	tuftedstem rush	
Juncus breweri	Brewer's rush	
Juncus bryoides	moss rush	
Juncus bufonius	toad rush	
Juncus capillaris	hairystem dwarf rush	
Juncus capitatus	leafybract dwarf rush	
Juncus chlorocephalus	greenhead rush	
Juncus confusus	Colorado rush	
Juncus cooperi	Cooper's rush	
Juncus covillei	Coville's rush	
Juncus cyperoides	Forbestown rush	
Juncus diffusissimus	slimpod rush	
Juncus drummondii	Drummond's rush	
Juncus drummondii	threeflower rush	
Juncus dubius	dubius rush	
Juncus dudleyi	Dudley's rush	
Juncus duranii	Duran's rush	
Juncus effusus	common rush	
Juncus effusus	lamp rush	
Juncus effusus	Pacific rush	
Juncus ensifolius	swordleaf rush	
Juncus falcatus	falcate rush	
Juncus hemiendytus	Herman's dwarf rush	
Juncus hemiendytus	Herman's dwarf rush	
Juncus howellii	Howell's rush	
Juncus kelloggii	Kellogg's dwarf rush	
Juncus leiospermus	Ahart's dwarf rush	
Juncus leiospermus	Red Bluff dwarf rush	
Juncus lesueurii	salt rush	
Juncus longistylis	longstyle rush	
Juncus luciensis	Santa Lucia dwarf rush	
Juncus macrandrus	longanther rush	
Juncus macrophyllus	longleaf rush	
Juncus marginatus	grassleaf rush	
Juncus mertensianus	Mertens' rush	
Juncus mexicanus	Mexican rush	
Juncus nevadensis	Sierra rush	
Juncus nodatus	stout rush	
Juncus nodosus	knotted rush	
Juncus occidentalis	western rush	

Juncus orthophyllus	straightleaf rush	
Juncus oxymeris	pointed rush	
Juncus parryi	Parry's rush	
Juncus patens	spreading rush	
Juncus phaeocephalus	brownhead rush	
Juncus regelii	Regel's rush	
Juncus rugulosus	wrinkled rush	
Juncus saximontanus	Rocky Mountain rush	
Juncus spp.	(rush)	
Juncus supiniformis	hairyleaf rush	
Juncus tenuis	poverty rush	
Juncus textilis	basket rush	
Juncus tiehmii	Nevada rush	
Juncus torreyi	Torrey's rush	
Juncus triformis	Yosemite dwarf rush	
Juncus uncialis	twelfth rush	
Juncus xiphioides	irisleaf rush	
Kerria spp.	(Japanese kerria)	Very Common
Kunzea spp.	(Burgan)	
Laburnum	golden chain tree	Very Common
Laburnum anagyroides	golden chain tree	Very Common
Laburnum spp.	(bean treegolden-chain)	Very Common
Lagerstroemia indica	Crape Myrtle	
Lagunaria spp.	(cow itch tree, Hercules' club, white field gourd)	
Lantana	lantana	Occasional
Lantana camara	lantana	Occasional
Lantana montevidensis	trailing shrubverbena	Occasional
Lantana spp.	Lantana	Occasional
Lantana urticoides	West Indian shrubverbena	Occasional
Lathyrus	pea	Very Common
Lathyrus angulatus	angled pea	Very Common
Lathyrus aphaca	yellow pea	Very Common
Lathyrus biflorus	twoflower pea	Very Common
Lathyrus bijugatus	drypark pea	Very Common
Lathyrus cicera	red pea	Very Common
Lathyrus delnorticus	Del Norte pea	Very Common
Lathyrus glandulosus	redwood pea	Very Common
Lathyrus hirsutus	Caley pea	Very Common
Lathyrus hitchcockianus	Bullfrog Mountain pea	Very Common
Lathyrus japonicus	beach pea	Very Common
Lathyrus japonicus	beach pea	Very Common
Lathyrus jepsonii	California pea	Very Common
Lathyrus jepsonii	Delta tule pea	Very Common
Lathyrus lanszwertii	Brown's pea	Very Common
Lathyrus lanszwertii	Lanszwert's pea	Very Common
Lathyrus lanszwertii	Nevada pea	Very Common
Lathyrus lanszwertii	Tracy's pea	Very Common
Lathyrus latifolius	perennial pea	Very Common
Lathyrus littoralis	silky beach pea	Very Common
Lathyrus nevadensis	Sierra pea	Very Common
Lathyrus odoratus	sweetpea	Very Common

Lathyrus palustris	marsh pea	Very Common
Lathyrus polyphyllus	leafy pea	Very Common
Lathyrus rigidus	stiff pea	Very Common
Lathyrus sativus	white pea	Very Common
Lathyrus sphaericus	grass pea	Very Common
Lathyrus splendens	pride of California	Very Common
Lathyrus spp.	(sweet pea)	Very Common
Lathyrus sulphureus	snub pea	Very Common
Lathyrus tingitanus	Tangier pea	Very Common
Lathyrus torreyi	Torrey's pea	Very Common
Lathyrus vestitus	Alefeld's pea	Very Common
Lathyrus vestitus	Bolander's pea	Very Common
Lathyrus vestitus	Pacific pea	Very Common
Laurus	laurel	Occasional
Laurus nobilis	Sweet Bay	Occasional
Laurus nobilis	Sweet Bay	Occasional
Laurus spp.	(Grecian laurel, sweet bay)	Occasional
Lavandula	lavender	
Lavandula spp.		
Lavandula stoechas	French lavender	
Leptospermum	teatree	Occasional
Leptospermum laevigatum	Australian teatree	Occasional
Leptospermum spp.	(tea trees)	Occasional
Leucadendron spp.		
Ligustrum	privet	Primary
Ligustrum lucidum		Primary
Ligustrum ovalifolium	California privet	Primary
Ligustrum spp.	(privet)	Primary
Lilium	lily	Occasional
Lilium bolanderi	Bolander's lily	Occasional
Lilium columbianum	Columbia lily	Occasional
Lilium humboldtii	Humboldt lily	Occasional
Lilium humboldtii	Humboldt's lily	Occasional
Lilium kelleyanum	Kelley's lily	Occasional
Lilium kelloggii	Kellogg's lily	Occasional
Lilium maritimum	coast lily	Occasional
Lilium occidentale	western lily	Occasional
Lilium pardalinum	leopard lily	Occasional
Lilium pardalinum	Pitkin Marsh lily	Occasional
Lilium pardalinum	Shasta lily	Occasional
Lilium pardalinum	Vollmer's lily	Occasional
Lilium pardalinum	Wiggins' lily	Occasional
Lilium parryi	lemon lily	Occasional
Lilium parvum	Sierra tiger lily	Occasional
Lilium rubescens	redwood lily	Occasional
Lilium spp.	(lilies)	Occasional
Lilium washingtonianum	Cascade lily	Occasional
Lilium washingtonianum	washington lily	Occasional
Lilium washingtonianum	Washington lily	Occasional
Linum	flax	Occasional
Linum bienne	pale flax	Occasional

Linum grandiflorum	flowering flax	Occasional
Linum lewisii	Lewis flax	Occasional
Linum lewisii	prairie flax	Occasional
Linum puberulum	plains flax	Occasional
Linum spp.	(flax)	Occasional
Linum trigynum	French flax	Occasional
Linum usitatissimum	common flax	Occasional
Litchi spp.		Primary
Lomandra spp.	(mat-rush nyalla, tanika)	Common
Lonicera	honeysuckle	Occasional
Lonicera caerulea	bluefly honeysuckle	Occasional
Lonicera caerulea	sweetberry honeysuckle	Occasional
Lonicera ciliosa	orange honeysuckle	Occasional
Lonicera conjugialis	purpleflower honeysuckle	Occasional
Lonicera etrusca	Etruscan honeysuckle	Occasional
Lonicera hispidula	pink honeysuckle	Occasional
Lonicera interrupta	chaparral honeysuckle	Occasional
Lonicera involucrata	black twinberry	Occasional
Lonicera involucrata	fly honeysuckle	Occasional
Lonicera japonica	Honeysuckle	Occasional
Lonicera japonica	Honeysuckle	Occasional
Lonicera spp.	(honeysuckles)	Occasional
Lonicera subspicata	Johnston's honeysuckle	Occasional
Lonicera subspicata	Santa Barbara honeysuckle	Occasional
Lonicera subspicata	southern honeysuckle	Occasional
Lonicera tatarica	Tatarian honeysuckle	Occasional
Loropetalum chinense	Loropetalum	
Lotus	trefoil	Very Common
Lotus aboriginus	rosy bird's-foot trefoil	Very Common
Lotus angustissimus	slender bird's-foot trefoil	Very Common
Lotus argophyllus	Fremont's birsfoot trefoil	Very Common
Lotus argophyllus	Santa Cruz Island silverhosackia	Very Common
Lotus argophyllus	Santa Cruz Island silverhosackia	Very Common
Lotus argophyllus	silver bird's-foot trefoil	Very Common
Lotus argyraeus	canyon bird's-foot trefoil	Very Common
Lotus benthamii	Bentham's broom	Very Common
Lotus corniculatus	bird's-foot trefoil	Very Common
Lotus crassifolius	big deervetch	Very Common
Lotus dendroideus	island broom	Very Common
Lotus dendroideus	Trask's island broom	Very Common
Lotus dendroideus	Veatch's island broom	Very Common
Lotus denticulatus	riverbar bird's-foot trefoil	Very Common
Lotus formosissimus	seaside bird's-foot trefoil	Very Common
Lotus glaber	narrow-leaf bird's-foot trefoil	Very Common
Lotus grandiflorus	chaparral bird's-foot trefoil	Very Common
Lotus hamatus	San Diego bird's-foot trefoil	Very Common
Lotus haydonii	rock bird's-foot trefoil	Very Common
Lotus heermannii	Heermann's bird's-foot trefoil	Very Common
Lotus humistratus	foothill deervetch	Very Common
Lotus incanus	woolly bird's-foot trefoil	Very Common
Lotus junceus	Biolett's rush broom	Very Common

Lotus junceus	rush broom	Very Common
Lotus micranthus	desert deervetch	Very Common
Lotus nevadensis	Davidson's bird's-foot trefoil	Very Common
Lotus nevadensis	Douglas' bird's-foot trefoil	Very Common
Lotus nevadensis	Nevada bird's-foot trefoil	Very Common
Lotus nuttallianus	wire bird's-foot trefoil	Very Common
Lotus oblongifolius	streambank bird's-foot trefoil	Very Common
Lotus pedunculatus	big trefoil	Very Common
Lotus pinnatus	meadow bird's-foot trefoil	Very Common
Lotus procumbens	Jepson's deerweed	Very Common
Lotus procumbens	silky deerweed	Very Common
Lotus rigidus	shrubby deervetch	Very Common
Lotus rubriflorus	redflower bird's-foot trefoil	Very Common
Lotus salsuginosus	coastal bird's-foot trefoil	Very Common
Lotus scoparius	common deerweed	Very Common
Lotus scoparius	western bird's-foot trefoil	Very Common
Lotus spp.	(bird's-foot trefoil, parrot's-beak, winged pea)	Very Common
Lotus stipularis	balsam bird's-foot trefoil	Very Common
Lotus stipularis	Ottley's bird's-foot trefoil	Very Common
Lotus strigosus	strigose bird's-foot trefoil	Very Common
Lotus unifoliolatus	American bird's-foot trefoil	Very Common
Lotus wrangelianus	Chilean bird's-foot trefoil	Very Common
Lotus yollabolliensis	Yolla Bolly bird's-foot trefoil	Very Common
Luma apiculata		
Lupinus	lupine	Very Common
Lupinus ×alpestris	Great Basin lupine	Very Common
Lupinus ×cymba-egressus		Very Common
Lupinus ×inyoensis		Very Common
Lupinus abramsii	Abrams' lupine	Very Common
Lupinus adsurgens	Drew's silky lupine	Very Common
Lupinus affinis	fleshy lupine	Very Common
Lupinus agardhianus	Agardh lupine	Very Common
Lupinus albicaulis	Shasta lupine	Very Common
Lupinus albicaulis	sicklekeel lupine	Very Common
Lupinus albifrons	Douglas' silver lupine	Very Common
Lupinus albifrons	silver lupine	Very Common
Lupinus andersonii	Anderson's lupine	Very Common
Lupinus angustiflorus	narrowflower lupine	Very Common
Lupinus antoninus	Anthony Peak lupine	Very Common
Lupinus apertus	summit lupine	Very Common
Lupinus arboreus	yellow bush lupine	Very Common
Lupinus arbustus	longspur lupine	Very Common
Lupinus argenteus	silvery lupine	Very Common
Lupinus aridus	desert lupine	Very Common
Lupinus arizonicus	Arizona lupine	Very Common
Lupinus benthamii	spider lupine	Very Common
Lupinus bicolor	miniature lupine	Very Common
Lupinus brevicaulis	shortstem lupine	Very Common
Lupinus brevior	short lupine	Very Common
Lupinus breweri	Brewer's lupine	Very Common
Lupinus breweri	matted lupine	Very Common

Lupinus caespitosus	stemless dwarf lupine	Very Common
Lupinus caespitosus	Utah lupine	Very Common
Lupinus caudatus	Kellogg's spurred lupine	Very Common
Lupinus caudatus	tailcup lupine	Very Common
Lupinus cervinus	Santa Lucia lupine	Very Common
Lupinus chamissonis	chamisso bush lupine	Very Common
Lupinus citrinus	orangeflower lupine	Very Common
Lupinus citrinus	orangeflower lupine	Very Common
Lupinus concinnus	bajada lupine	Very Common
Lupinus concinnus	Orcutt's lupine	Very Common
Lupinus confertus	crowded lupine	Very Common
Lupinus congdonii	Congdon's lupine	Very Common
Lupinus constancei	lassicus lupine	Very Common
Lupinus covillei	shaggy lupine	Very Common
Lupinus croceus	Mt. Eddy lupine	Very Common
Lupinus culbertsonii	Hoskett Meadows lupine	Very Common
Lupinus dalesiae	Quincy lupine	Very Common
Lupinus densiflorus	whitewhorl lupine	Very Common
Lupinus duranii	Mono Lake lupine	Very Common
Lupinus elatus	tall silky lupine	Very Common
Lupinus elmeri	Elmer's lupine	Very Common
Lupinus excubitus	grape soda lupine	Very Common
Lupinus excubitus	Hall's bush lupine	Very Common
Lupinus excubitus	interior bush lupine	Very Common
Lupinus excubitus	mountain bush lupine	Very Common
Lupinus excubitus	Mountain Springs bush lupine	Very Common
Lupinus eximius	San Mateo tree lupine	Very Common
Lupinus flavoculatus	yelloweyes	Very Common
Lupinus formosus	summer lupine	Very Common
Lupinus fulcratus	greenstipule lupine	Very Common
Lupinus gracilentus	green slender lupine	Very Common
Lupinus grayi	Sierra lupine	Very Common
Lupinus guadalupensis	Guadalupe Island lupine	Very Common
Lupinus hirsutissimus	stinging annual lupine	Very Common
Lupinus holmgrenianus	Holmgren's lupine	Very Common
Lupinus horizontalis	sunset lupine	Very Common
Lupinus hyacinthinus	San Jacinto lupine	Very Common
Lupinus lapidicola	Heller's dwarf lupine	Very Common
Lupinus latifolius	broadleaf lupine	Very Common
Lupinus lepidus		Very Common
Lupinus leucophyllus	velvet lupine	Very Common
Lupinus littoralis	seashore lupine	Very Common
Lupinus longifolius	longleaf bush lupine	Very Common
Lupinus ludovicianus	San Luis lupine	Very Common
Lupinus luteolus	pale yellow lupine	Very Common
Lupinus lyallii	dwarf mountain lupine	Very Common
Lupinus magnificus	Panamint Mountain lupine	Very Common
Lupinus meionanthus	Lake Tahoe lupine	Very Common
Lupinus microcarpus		Very Common
Lupinus nanus	Menker's lupine	Very Common
Lupinus nanus	sky lupine	Very Common

Lupinus nevadensis	Nevada lupine	Very Common
Lupinus nipomensis	Nipomo Mesa lupine	Very Common
Lupinus obtusilobus	bluntlobe lupine	Very Common
Lupinus odoratus	Mojave royal lupine	Very Common
Lupinus onustus	Plumas lupine	Very Common
Lupinus pachylobus	Mt. Diablo lupine	Very Common
Lupinus padre-crowleyi	Dedecker lupine	Very Common
Lupinus pallidus	pale desert lupine	Very Common
Lupinus palmeri	bluebonnet lupine	Very Common
Lupinus peirsonii	long lupine	Very Common
Lupinus polycarpus	smallflower lupine	Very Common
Lupinus polyphyllus	bigleaf lupine	Very Common
Lupinus pratensis	Inyo Meadow lupine	Very Common
Lupinus prunophilus	hairy bigleaf lupine	Very Common
Lupinus punto-reyesensis	Point reyes lupine	Very Common
Lupinus purpurascens	Yuba lupine	Very Common
Lupinus pusillus	Intermountain lupine	Very Common
Lupinus pusillus	rusty lupine	Very Common
Lupinus rivularis	riverbank lupine	Very Common
Lupinus ruber	red lupine	Very Common
Lupinus saxosus	rock lupine	Very Common
Lupinus sellulus	Donner Lake lupine	Very Common
Lupinus sericatus	Cobb Mountain lupine	Very Common
Lupinus sericeus		Very Common
Lupinus shockleyi	purple desert lupine	Very Common
Lupinus sparsiflorus	Mojave lupine	Very Common
Lupinus sparsiflorus	Pond's Mojave lupine	Very Common
Lupinus spectabilis	shaggyhair lupine	Very Common
Lupinus spp.	(lupines)	Very Common
Lupinus stiversii	harlequin annual lupine	Very Common
Lupinus sublanatus	Mono lupine	Very Common
Lupinus subvexus	valley lupine	Very Common
Lupinus succulentus	hollowleaf annual lupine	Very Common
Lupinus tidestromii	Tidestrom's lupine	Very Common
Lupinus tidestromii	Tidestrom's lupine	Very Common
Lupinus tracyi	Tracy's lupine	Very Common
Lupinus truncatus	collared annual lupine	Very Common
Lupinus uncialis	inchhigh lupine	Very Common
Lupinus vallicola	open lupine	Very Common
Lupinus variicolor		Very Common
Lupinus versicolor	manycolored lupine	Very Common
Lycopersicom spp.		
Macadamia spp.	(macadamia)	Occasional
Magnolia spp.	Magnolia	Occasional
Malus	apple	Very Common
Malus fusca	Oregon crabapple	Very Common
Malus pumila	paradise apple	Very Common
Malus spp.	Apple	Very Common
Malus spp.	Flowering CrabApple	Very Common
Malva	mallow	Occasional
Malva assurgentiflora		Occasional

Malva moschata	musk mallow	Occasional
Malva neglecta	common mallow	Occasional
Malva nicaeensis	bull mallow	Occasional
Malva parviflora	cheeseweed mallow	Occasional
Malva pusilla	low mallow	Occasional
Malva spp.	(mallow)	Occasional
Malva sylvestris	high mallow	Occasional
Malva verticillata	cluster mallow	Occasional
Mangifera spp.	(mango)	Occasional
Medicago	alfalfa	Very Common
Medicago arabica	spotted medick	Very Common
Medicago lupulina	black medick	Very Common
Medicago minima	burr medick	Very Common
Medicago orbicularis	blackdisk medick	Very Common
Medicago polymorpha	burclover	Very Common
Medicago praecox	Mediterranean medick	Very Common
Medicago sativa	alfalfa	Very Common
Medicago sativa	yellow alfalfa	Very Common
Medicago spp.	(alfalfa, bur clover, yellow trefoil)	Very Common
Melaleuca quinquenervia	Paperback Melaleuca	Occasional
Melaleuca spp.	(honey myrtle, bottlebrush)	Occasional
Melilotus	sweetclover	Very Common
Melilotus indicus	annual yellow sweetclover	Very Common
Melilotus officinalis	yellow sweetclover	Very Common
Melilotus spp.		Very Common
Mentha	mint	Occasional
Mentha ×piperita	peppermint	Occasional
Mentha ×villosa		Occasional
Mentha aquatica	water mint	Occasional
Mentha arvensis	wild mint	Occasional
Mentha canadensis		Occasional
Mentha pulegium	pennyroyal	Occasional
Mentha spicata	spearmint	Occasional
Mentha spp.	Mint	Occasional
Mentha suaveolens	apple mint	Occasional
Mesembryanthemum	iceplant	Occasional
Mesembryanthemum crystallinum	common iceplant	Occasional
Mesembryanthemum nodiflorum	slenderleaf iceplant	Occasional
Mesembryanthemum spp.	(ice plant)	Occasional
Metrosideros spp.	(bottlebrush, iron tree, New Zealand Christmas tree)	Occasional
Michelia spp.	(michelia)	Occasional
Monotoca spp.	(broomheaths)	Occasional
Muehlenbeckia	maidenhair vine	
Muehlenbeckia complexa	maidenhair vine	
Muehlenbeckia hastatula	wirevine	
Muehlenbeckia spp.	(maidenhair vine, wire plant)	
Myoporum	myoporum	
Myoporum laetum	ngaio tree	
Myoporum spp.	(myoporum, Ngaio-tree)	
Myosotis	forget-me-not	Occasional