

LOST IN THE MIST

How Glyphosate Use Disproportionately Threatens California's Most Impoverished Counties



EXECUTIVE SUMMARY

Glyphosate, the active ingredient in Monsanto's Roundup and other weedkillers, is the most widely used pesticide in the United States and has been designated as a probable human carcinogen by the World Health Organization. More than 280 million pounds were used in the United States agricultural sector in 2012.

While the majority of glyphosate was applied in the country's Midwest, a significant portion was used in California. For this analysis the Center for Biological Diversity – in coordination with the Center for Environmental Health, El Quinto Sol de America, Californians for Pesticide Reform, the Center for Food Safety, and the Pesticide Action Network – examined where glyphosate was used in California and compared it to the socioeconomic and racial makeup of those areas.

Our key finding: In 2013, more than half of the glyphosate used in California (54 percent) was applied in the state's eight most impoverished counties.

The counties that had the highest percentage of residents living below the federal poverty line in 2013 are mostly located in the southern part of the Central Valley. They are Tulare, Fresno, Merced, Del Norte, Madera, Lake, Imperial and Kern.

Additionally, 53 percent of the residents in these eight counties identified as Hispanic or Latino, compared to 38 percent in the state as a whole.

The findings reveal a troubling pattern of the state's poorest and minority populations disproportionately living in regions where glyphosate is frequently sprayed. California is, rightly, on the verge of designating glyphosate as a known carcinogen. The next step must be addressing the environmental injustice that occurs when runaway pesticide use unfairly burdens certain populations in the state.

INTRODUCTION

Glyphosate is the most widely used pesticide in the United States (1). In 2012, the most recent year for which data have been made available, more than 280 million pounds were applied in the U.S. agricultural sector alone, a 10-fold increase since 1995 (2). This dramatic increase in glyphosate use is driven largely by the widespread adoption of genetically engineered, glyphosate-resistant corn, soybeans, cotton and other crops (3).

Glyphosate and its metabolites are commonly found in air, rainfall and surface water samples near sites of use (4-6). Glyphosate-resistant crops have also been shown to contain high levels of residual pesticide (7,8), glyphosate residues are regularly found in bread (9), and glyphosate and its metabolites are frequently detected in the urine of both farm and non-farm families (9,10).

The massive and increasing use of glyphosate is especially concerning in light of its potential health impacts. The World Health Organization's International Agency for Research on Cancer (IARC) recently

conducted an exhaustive review of the scientific literature and concluded that glyphosate is "probably carcinogenic to humans" (Group 2A) (11). IARC carefully weighed evidence in three areas, and found that: 1) There was sufficient evidence to conclude that glyphosate causes cancer in animal studies; 2) There was evidence that farmers exposed to glyphosate have higher rates of non-Hodgkin's lymphoma, an immune system cancer; and 3) Glyphosate can damage DNA, one well-characterized pathway to cancer (12). Glyphosate's Group 2A designation now puts it in the same category as DDT (13).

IARC's finding that glyphosate causes cancer in animals prompted the California Office of Environmental Health Hazard Assessment to announce that it intends to list glyphosate as a known carcinogen (14). Since California is on track to be the first regulatory agency in the United States to acknowledge that glyphosate is carcinogenic, it's important to understand how glyphosate is used in California and who is most likely to be exposed.

Estimated Agricultural Use for Glyphosate, 2012

EPEst-Low

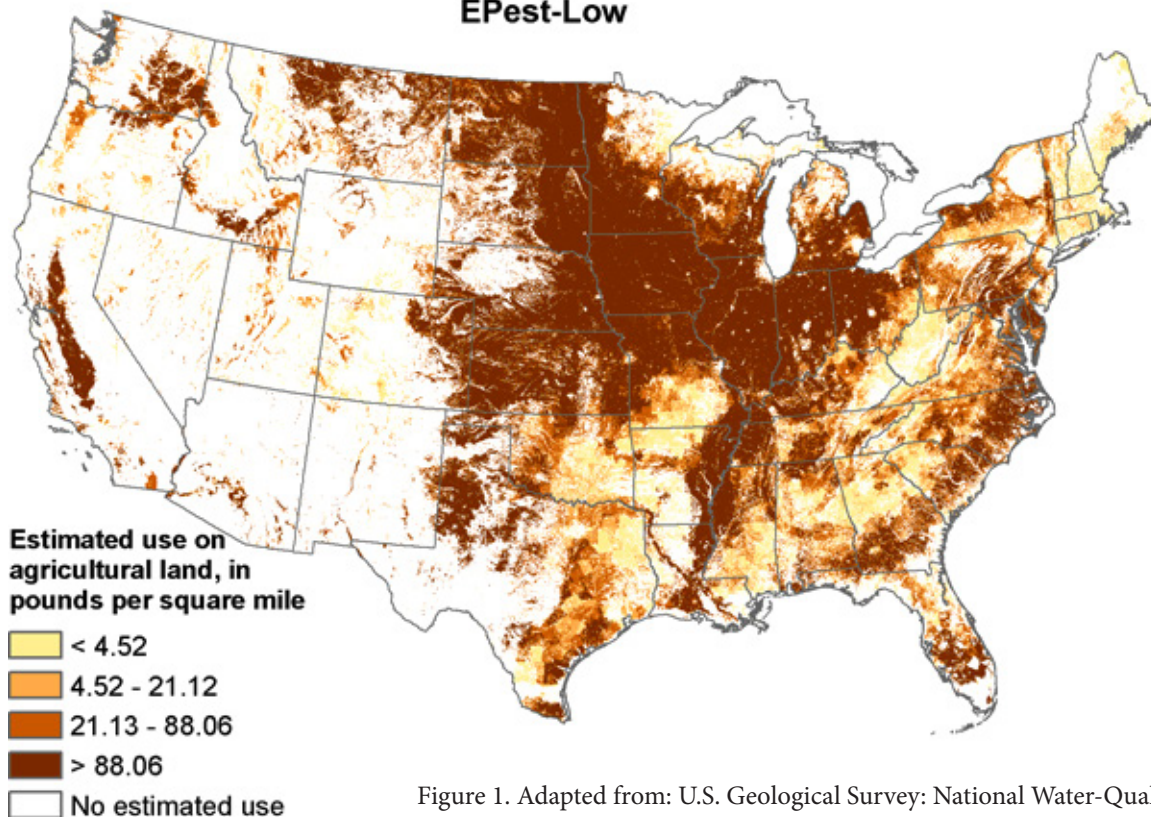


Figure 1. Adapted from: U.S. Geological Survey: National Water-Quality Assessment (NAWQA) Program. Pesticide National Synthesis Project. Pesticide use maps - glyphosate. Available at: https://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2012&map=GLYPHOSATE&hilo=L&disp=Glyphosate

ANALYSIS

Data from the California Department of Pesticide Regulation (CDPR) were analyzed to gain a clearer picture of the geographical distribution of glyphosate use in the state (15).

Much attention has been focused on glyphosate use in the Midwest, because that is where the majority is used. However, the usage map in Figure 1 indicates that glyphosate is applied very intensively in California's Central Valley as well. Pesticide use data from the CDPR indicates that 10,370,147 pounds of glyphosate (16) were applied in California in 2013 (17). Even though California is a large state, most of that use was confined to the southern half of the Central Valley. Specifically, 65 percent of all glyphosate used in the state was applied in the eight counties that make up the San Joaquin Valley (18). It is no surprise then that the U.S. Geological Survey found that 65 percent of lake, river and stream samples in the San Joaquin-Tulare basin had detectable levels of glyphosate and/or its metabolites (19).

Data from the U.S. Census Bureau were analyzed and compared to pesticide-use data from California (20).

Perhaps most striking is the distribution of glyphosate along socioeconomic lines. In 2013 more than half (54 percent) of the glyphosate in California was applied in the eight counties that have the highest percentage of people living below the federal poverty line (21). The other 46 percent was applied in the remaining 50 counties (Figure 2). The relative land area of those eight counties is outlined in Figure 3. These eight counties (Tulare, Fresno, Merced, Del Norte, Madera, Lake, Imperial and Kern) had 22.7 percent to 29.6 percent of their populations living below the federal poverty line. The average for the state of California in 2013 was 16.8 percent. A map of poverty data overlaid with glyphosate-use data is shown in Figure 4.

The racial makeup in these counties differed substantially from the makeup of the state. In 2013, 53 percent of the residents in these eight counties identified as Hispanic or Latino, compared to 38 percent in the state as a whole (22). So not only is glyphosate use geographically concentrated, it is socioeconomically and racially concentrated as well. This correlates with a 2014 California Department of Public Health study showing that Hispanic children were 46 percent more likely than white children to attend schools near hazardous pesticide use and 91 percent more likely to attend schools near the highest hazardous pesticide use (23).

Conclusion: The majority of glyphosate that was applied in the state of California in 2013 was in the eight counties that had the highest percentage of people living below the federal poverty line. The combined population of these eight counties was also majority Hispanic or Latino, much higher than the state as a whole. This indicates that poor and minority populations in the state may be unequally exposed to a chemical that can seriously impact human health. This report correlates with a recent study by the California Office of Environmental Health Hazard Assessment that found Hispanics and people in poverty disproportionately live in areas of high pesticide use (24). Now that the state is close to recognizing that glyphosate is a health hazard, the next step will be to take action to prevent this environmental injustice.

GLYPHOSATE USE

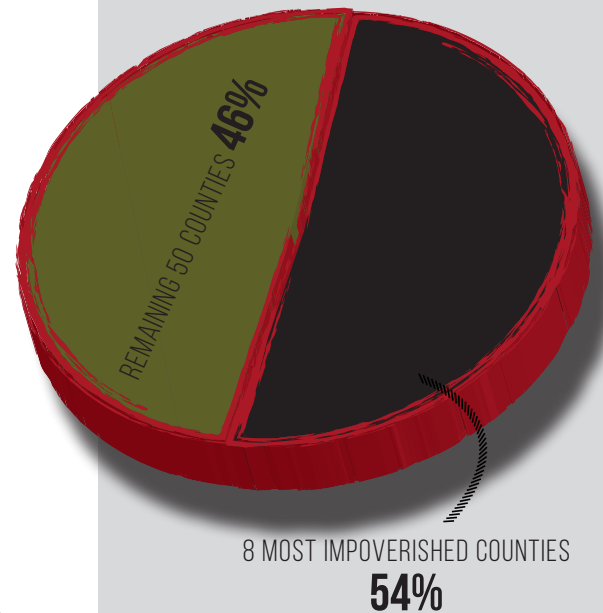


Figure 2. Data for glyphosate use by county were obtained according to (15).

CALIFORNIA LAND AREA

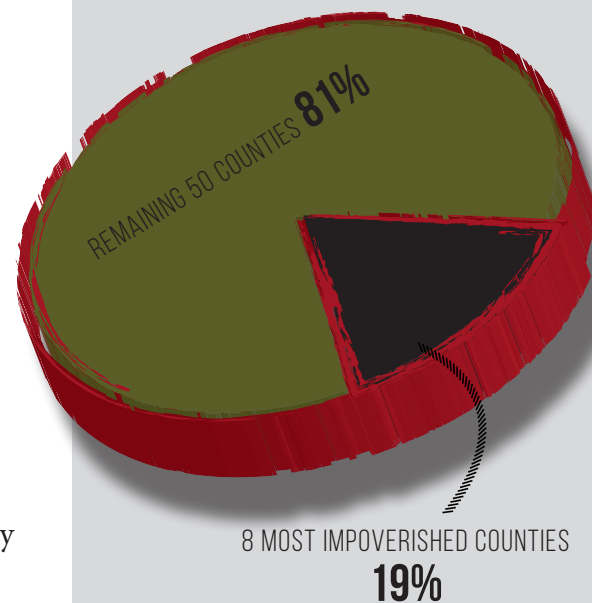


Figure 3. Data for land area by county were obtained from <http://www.indexmundi.com/facts/united-states/quick-facts/california/land-area#chart>.

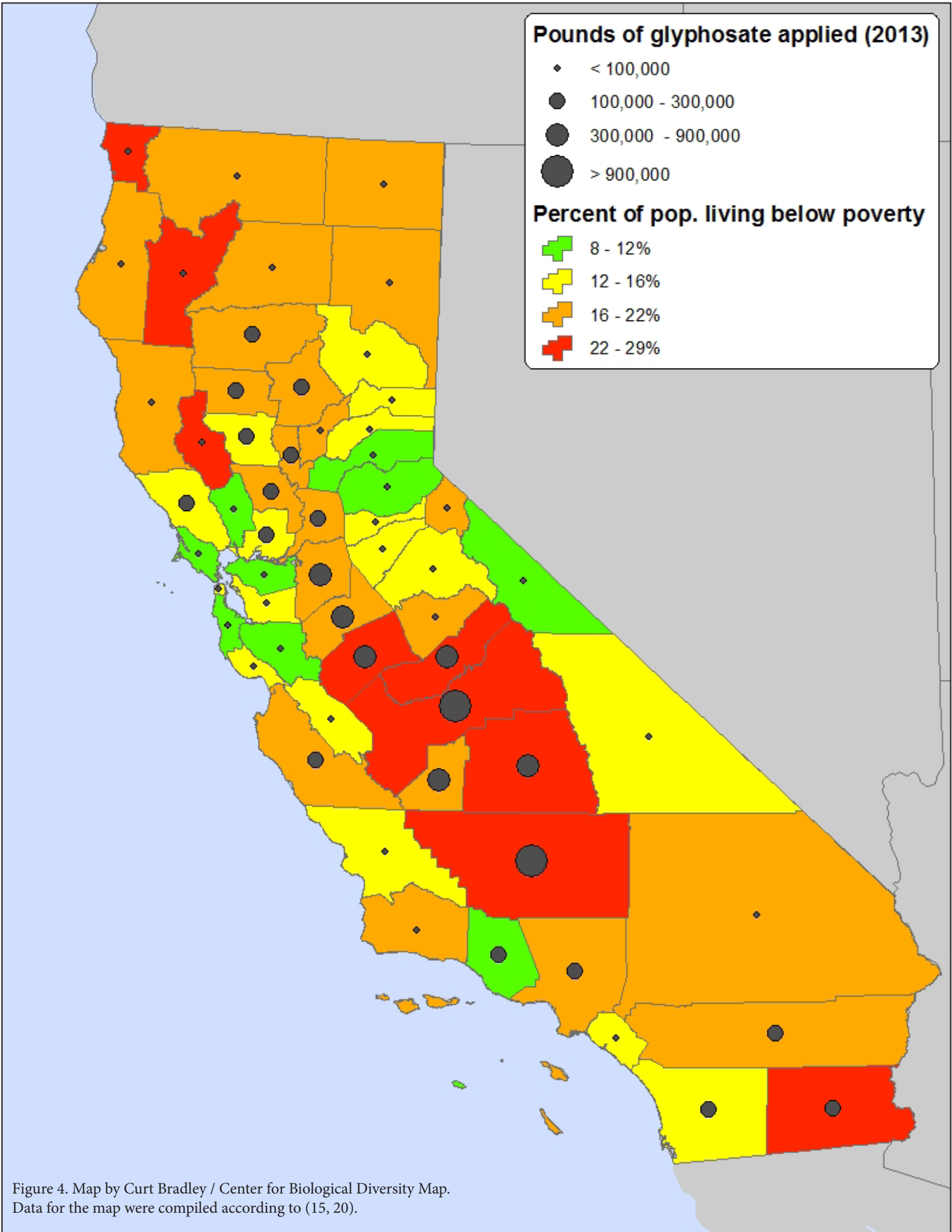


Figure 4. Map by Curt Bradley / Center for Biological Diversity Map. Data for the map were compiled according to (15, 20).

CREDITS

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ENDNOTES

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14. OEHHA. The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment. NOTICE OF INTENT TO LIST CHEMICALS BY THE LABOR CODE MECHANISM: TETRACHLORVINPHOS, PARATHION, MALATHION, GLYPHOSATE 2015; http://oehha.ca.gov/prop65/CRNR_notices/admin_listing/intent_to_list/090415LCset27.html.
15. Data were analyzed from the California Department of Pesticide Regulation Pesticide Use Reporting Database found here: http://www.cdpr.ca.gov/docs/pur/pur13rep/13_pur.htm. 2013 County Summary Reports (indexed by chemical) were obtained for each county and glyphosate use was totaled and compared.
16. Since glyphosate is manufactured and sold in many different salt forms, all forms of glyphosate were totaled and referred to as glyphosate in this report. These forms include: glyphosate, glyphosate diammonium salt, glyphosate dimethylamine salt, glyphosate isopropylamine salt, glyphosate monoammonium salt, glyphosate potassium salt, and glyphosate trimesium salt.
17. Pesticide use data that are reported to the CDPR are primarily for agricultural applications and do not include some home and commercial uses.
18. The eight counties in the San Joaquin Valley include: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare.
19. Scribner EA, Battaglin WA, Gilliom RJ, Meyer MT. United States Geological Survey. Concentrations of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate in ground- and surface-water, rainfall, and soil samples collected in the United States, 2001-06. U.S. Geological Survey Scientific Investigations Report 2007-5122. 2007.
20. The United States Census Bureau Small Area Income and Poverty Estimates (SAIPE) data and mapping tool (found here: <http://www.census.gov/did/www/saipe/data/interactive/saipe.html>) was analyzed with the following filters: State=California, Years=2013, Counties=All. The resulting table that was generated contained "percent in poverty" data for each county in California. These counties were then compared to high pesticide use counties.
21. The eight California counties that had the highest percentage of people living below the federal poverty line in 2013 were: Tulare, Fresno, Merced, Del Norte, Madera, Lake, Imperial and Kern.
22. The United States Census Bureau State and County Quickfacts were analyzed for the state of California at: <http://quickfacts.census.gov/qfd/states/06000.html>. American Community Survey: Demographic and Housing Estimates were analyzed for 2013 data on race in each county. The number of people who identified as Hispanic or Latino (of any race) were added together for Tulare, Fresno, Merced, Del Norte, Madera, Lake, Imperial and Kern counties and divided by the total population in those counties.
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