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Oriental Fruit Fly Cooperative Eradication Program

Santa Clara County, California

Environmental Assessment July 2015

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**Environmental Assessment
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I. Need for the Proposal

The oriental fruit fly (OFF), *Bactrocera dorsalis* (Hendel) (synonym == *Dacus dorsalis* Hendel), is a destructive agricultural pest in many parts of the world. It has a long history of being a serious pest of tropical and subtropical fruits in Southwest Asia and most of the Pacific Islands. Following introduction into the Hawaiian Islands in the 1940s (NAPIS, n.d.), this fly multiplied rapidly and currently is known to infest more than 125 different host fruits in the State of Hawaii. Worldwide, OFF has been recorded infesting more than 230 kinds of fruit and vegetables, including citrus, guava, mango, papaya, avocado, banana, loquat, tomato, Surinam cherry, rose apple, passion fruit, persimmon, pineapple, peach, pear, apricot, fig, and coffee berries.

An adult OFF can fly over 7 miles unaided but may travel 30 miles or more in 1 day utilizing passive transport such as wind, according to laboratory and field studies (Froerer et al., 2010; Liang et al., 2001). One female OFF can lay up to 1,500 eggs (CDFA, 2006). OFF establishment would be disastrous to agricultural production in areas where host plants are grown. OFF has been identified and eradicated numerous times in the continental United States since it was first found in California in 1960. Although OFF is not known to be established in California, detection of new infestations occurs on almost an annual basis. Reintroduction is most often due to infected fruits and vegetables that are brought across the border without inspection.

Between June 22 and June 23, 2015, six adult male OFF were recovered from fly traps in the Cupertino area of Santa Clara County, California (CDFA, 2015a, 2015b, 2015c, 2015d). The region surrounding the OFF infestation is a mixture of urban and residential neighborhoods, commercial districts, schools, major freeways and railroads, airports, harbors and beaches, city parkland and developed recreational property. There are 8 organic farms and 4 certified farmers markets within the proposed program area, and numerous landscape and retail plant nurseries in the vicinity of the infested area (APHIS, 2015 and CDFCA, 2015e; see figure 1).

Many OFF host plant species are grown in Santa Clara County and adjacent regions, which increases the potential environmental impact of the current infestations. Because of the species' rapid population growth and potential for damage, OFF infestations represent a major threat to the agriculture and environment of California and other U.S. mainland States.

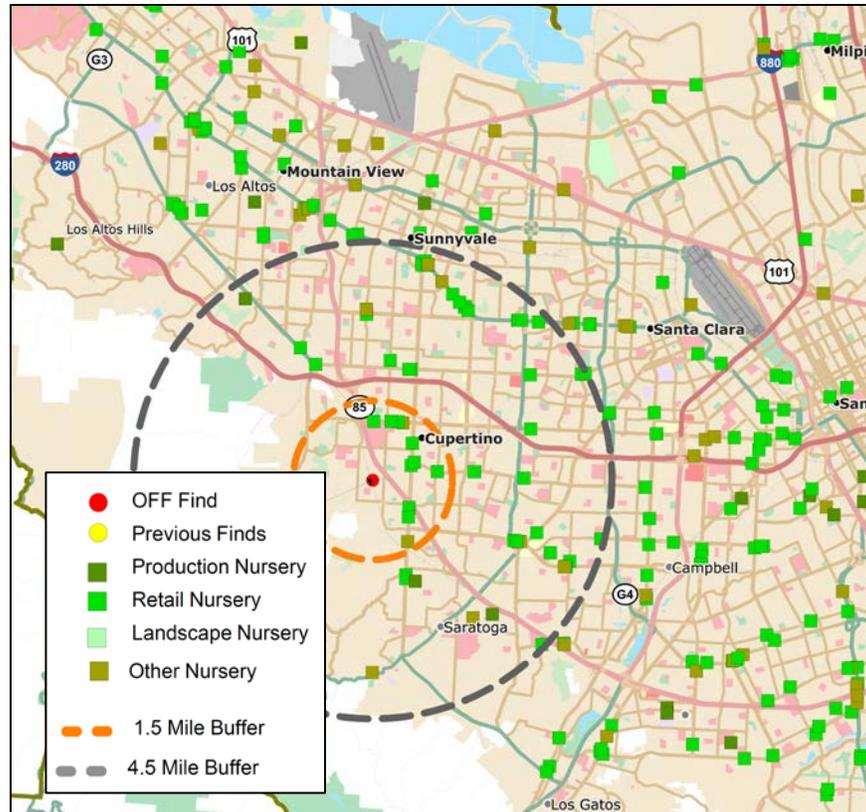


Figure 1. Plant nurseries in the vicinity of the initial OFF detections.
(CDFA, 2015e.)

California pursues an ongoing OFF detection and control program. As of July 1 the State is currently overseeing 11 *Bactrocera* spp. actions. Delimitation and eradication by the State take place prior to regulatory quarantines in order to eliminate fruit fly infestations before the quarantine threshold is reached.

The U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service (APHIS) and the California Department of Food and Agriculture (CDFA) are proposing a cooperative program to eradicate the OFF infestation and prevent the spread of OFF to non-infested areas of the United States. APHIS’ authority for cooperation in the program is the Plant Protection Act (Title 4 of the Agricultural Risk Protection Act of 2000), which authorizes the Secretary of Agriculture to carry out operations to eradicate insect pests, and to use emergency measures to prevent the dissemination of plant pests new to, or not widely distributed throughout, the United States.

APHIS has cooperated with the California, Florida, Puerto Rico and Texas Departments of Agriculture on fruit fly eradication programs since 1984. To date, every fruit fly population targeted by APHIS cooperative programs has been successfully eradicated. The most recent OFF

eradication program conducted by APHIS, in cooperation with CDFA, was completed on June 24, 2015, in Los Angeles County (personal communication, Mullaly to Shalom, 06/25/2015). Monitoring for *Bactrocera* spp. continues throughout all susceptible counties of California.

CDFA/USDA cooperative program protocols for OFF eradication employ various “action triggers” for Federal involvement; triggers include fly life stage, location, and timing of detections, among other variables. Because there is commercial production of potential OFF-hosts (apricot, grape, prune, cherry, tomato, pepper, and walnut) within a 4.5 mile radius of the Santa Clara OFF detections, a regulatory quarantine was implemented on June 24, 2015 with the find of the sixth adult OFF (APHIS 2015; personal communications, Mullaly and Usnick to Shalom, 06/25/2015). Surveys for OFF have intensified in the neighborhood of the finds; see map of the proposed program area¹ in appendix A.

This environmental assessment (EA) analyzes the environmental consequences of alternatives which have been considered for OFF eradication, and considers, from a site-specific perspective, environmental issues relevant to this particular program. Alternatives for OFF eradication have been discussed and analyzed comprehensively by APHIS and its cooperating partners since 1984.

APHIS first evaluated the environmental impacts of fruit fly control technologies in the *Fruit Fly Cooperative Control Program, Final Environmental Impact Statement—2001* (EIS1) (APHIS, 2001). APHIS reexamined its findings and introduced an additional tool for eradication in the *Use of Genetically Engineered Fruit Fly and Pink Bollworm in APHIS Plant Pest Control Programs, Final Environmental Impact Statement—2008* (EIS2) (APHIS, 2008). Both EIS1 and EIS2 consider fruit fly risks and mitigations at the programmatic level. This case-specific EA incorporates the findings of EIS1 and EIS2 by reference.

The eradication measures being considered for this program have been discussed and analyzed comprehensively within APHIS fruit fly chemical risk assessments (APHIS, 2014, 2003, 1999, 1998a and 1998b). These documents are incorporated by reference and summarized within this EA. Environmental documentation for APHIS fruit fly control programs may be viewed online via the following links: [APHIS fruit fly control program environmental documentation](#) and [APHIS GE control applications for plant health](#).

¹ For the purposes of this document, “program area” refers to everywhere inside the quarantine boundary, and includes both eradication treatment and regulatory control zones.

II. Alternatives

Alternatives considered for this proposed program include (A) no Federal action, and (B) the preferred alternative, eradication using an integrated pest management (IPM) approach. Component techniques of alternative B include the use of regulatory controls, high density trapping, host larval survey, and chemical pesticides to facilitate the timely elimination of the current OFF infestation. These alternatives and their component techniques have been discussed and analyzed comprehensively within EIS1 and EIS2 (APHIS, 2001 and 2008), and are incorporated by reference and summarized within this EA.

A. No Action

Under the no action alternative there would be no Federal efforts to eradicate OFF or restrict its expansion from the infested area. In the absence of a Federal effort, quarantine and control would be left to State and local government, grower groups, and individuals. Expansion of the infestation would be influenced by any controls exerted over it, by the proximity of host plants, and by climatic conditions.

“No treatment” might be the only reasonable alternative for some sensitive sites. In such cases, lack of treatment could lead to a continuing and expanding infestation. An expansion of the infestation would likely result in substantial economic losses to growers in the United States, as well as the loss of U.S. export markets.

Under the no action alternative, APHIS would continue cooperative practices to support the CDFA detection trapping program and research. (For details about the California State program to control OFF, please visit use the following link: [CDFA OFF project information.](#))

B. Eradication Using an IPM Approach (Preferred Alternative)

APHIS’ preferred alternative for the Cupertino OFF program is eradication using an integrated pest management (IPM) approach. This alternative combines quarantine and commodity certification with eradication treatments.

CDFA (2015e) determined non-pesticidal options are not available to effectively eradicate OFF. APHIS concurs with their assessment. Eradication efforts may employ any or a combination of the following:

- no action,
- regulatory quarantine treatment and control of host materials and regulated articles,
- host removal,
- eradication chemical applications (male annihilation bait stations and/or foliar spray spot treatment), and
- mass trapping for monitoring and surveillance purposes.

The program area for the current infestation includes those portions of Santa Clara County which fall within an 81 square mile boundary (see map in appendix A) centered on each infestation site. The current boundary may be expanded to include other properties if additional adult flies or life stages are found.

The OFF progresses through a four-stage life cycle: egg, larva, pupa and adult. Breeding is continuous, with several annual generations. The adult fly usually lives from 1 to 3 months but can survive up to a year in cool climates (FDACS, 1999). APHIS' cooperative programs to eradicate OFF infestations in California use established procedures and treatments that have been designed with the OFF life cycle in mind:

- McPhail protein bait traps and Jackson pheromone lure traps are placed in varying densities throughout the program area to delimit the infestation and to monitor post-treatment fly populations. These traps are serviced on a regular schedule for a period equal to three OFF generations beyond the date of the last fly find.
- Male attractant technique (MAT) is the standard eradication treatment practice for *Bactrocera* spp., including OFF. MAT is deployed in a 1.5-mile radius from each GFF detection site for a minimum of 9 square miles. Up to 600 small, gel-like bait stations per square mile are applied to utility poles and street trees at least 6 feet above the ground. For the Cupertino program, traps may be used where there are no suitable inanimate surfaces to place bait stations. The treatment is repeated every 2 to 6 weeks for a maximum 15 total applications per acre per year, depending on the severity of the infestation (State of California, 2015). These bait stations contain a male attractant (methyl eugenol (ME)) that is mixed with a small amount of the pesticide naled or the pesticide spinosad. The bait stations attract and kill male OFF looking for an opportunity to breed and feed on the attractant. The females go unmated and, therefore, no offspring are produced, effectively causing eradication of the population.
- Should evidence of a breeding OFF population be confirmed, a targeted, ground-based foliar bait treatment will also be applied. For such treatment, host trees and plants within a 200-meter radius of the

find site are treated with highly localized spray that consists of an organic formulation of the pesticide spinosad and protein hydrolysate bait. Protein hydrolysate is a common attractant used in fruit fly treatments, increasing the efficacy of chemical applications, and reducing the area of pesticide treatments needed for control (Prokopy et al., 1992). Pest fruit flies are attracted to the protein hydrolysate, which can be derived from plants or yeast, where they then receive a lethal dose of the pesticide that is mixed with the attractant. Also, the evidence of a breeding population (mated female OFF, larvae, pupae, or multiple adult captures) will result in the removal of host fruit from all known infested and adjacent properties within a 100-meter radius (CDFA, 2015f).

A quarantine boundary will be established to ensure that any host material that leaves the program area is free of OFF. Host material may be treated in enclosed areas or containers by, cold treatment, vapor heat treatment, irradiation, or fumigation with methyl bromide (APHIS, 2004 and 2001).

Growers will be able to move their harvested fruit out of the quarantined area, under a limited permit, to enclosed facilities for processing into juice or for packing, after APHIS-approved methyl bromide treatment in the field or at the packing shed take place. Grower of host fruits may also treat their orchards using approved field program treatments and be certified for crop movement to packing sheds under compliance agreement. Should the OFF quarantine spread to federally-protected historical sites, wilderness, or tribal lands, program treatments will be restricted to those approved for the type of site in question.

Before taking action, program officials are to inform the public and impacted industry via press releases, meetings, and other forms of communication appropriate for the recipients. Notification letters will be sent to trading partners as they are identified. Given the potential impacts to commercial production, grove owners, packing sheds, nurseries, vendors, and other industry operations handling OFF host material will be notified of the OFF quarantine location and treatment schedule.

For more detailed information on the alternatives considered for OFF control and their component methods, refer to the previously mentioned fruit fly risk assessments (APHIS, 2014, 2003, 1999, 1998a, and 1998b).

III. Potential Environmental Consequences

This EA analyzes the potential environmental consequences of alternatives considered for OFF control. The site-specific characteristics of the OFF

program area were considered with respect to the preferred alternative's potential to affect human health, nontarget species (including threatened and endangered species), and environmental quality. Potentially sensitive sites have been identified, considered, and accommodated through special selection of eradication methods and use of specific mitigation measures. Should OFF detections lead to an expansion of the program boundary, APHIS will conduct any necessary additional environmental analysis.

A. No Action

Lack of Federal action would place the burden of eradication on the State of California. It is reasonable to expect that OFF populations would continue to expand in size and area, leading to increased quarantine efforts. Any failure of those efforts could lead to the establishment of this pest within the conterminous United States. If eradication attempts are unsuccessful, APHIS expects substantial economic losses to growers in the United States. Crop loss is likely to lead to commodity scarcity, higher costs for U.S. consumers, and the temporary or permanent loss of U.S. valuable export markets.

B. Preferred Alternative

The preferred alternative, eradication using an IPM approach, may employ any or a combination of the following:

- no action,
- regulatory quarantine treatment and movement control of host materials and regulated articles,
- host removal,
- eradication chemical applications (male annihilation bait stations and/or foliar spray spot treatment), and
- mass trapping for monitoring and surveillance purposes.

The attractant used in the OFF MAT poses a slight risk to certain terrestrial invertebrates that are attracted to the bait due to the presence of ME, and could receive a lethal dose of naled or spinosad. However, based on the selective nature of the attractant the impacts would be localized and transient and not anticipated to result in population level effects to sensitive taxa including beneficial arthropods (APHIS, 2014).

Review of the treatment protocols by CDFA and USDA indicates that the naled and spinosad formulations used for OFF MAT are not likely to cause adverse environmental or human health risks (APHIS, 2014, 1998a and 1998b). Therefore, the discussion in this section will focus on the other eradication measures of the preferred alternative.

1. Affected Environment

a. Land Characteristics and Demographics

Land use in the immediate program area is primarily urban residential, with a variety of parks and high technology firms in the vicinity. The City of San Jose lies east and south of Cupertino; to the north are City of San Francisco and the Bay. The shores of the Pacific Ocean lie about 20 miles to the west. The region typically enjoys a temperate climate: winters are generally mild and wet, while summers can be dry and hot.

Santa Clara County is highly developed and has a population of approximately 1.8 million residents. Cupertino City covers approximately 11 square miles and in 2013 reported a population of 60,189. Cities in the county are densely populated – census figures averaged about 5,180 residents per square mile in Cupertino, compared to 1,380 per square mile for the county overall (USCB, 2015). Table 2 shows distances from the program area to demographic areas of potential concern.

Table 2. Distance from center of proposed program area to certain land sites.*

Designated Land Use	Distance Rounded Off to Nearest Tenth of a Mile
Nearest airports	San Jose International: 7.2 miles Moffett Federal Airfield: 6.9 miles
Nearest Federal refuge	San Francisco Bay National Wildlife Refuge: 7.9 miles
Parkland and open spaces	9 within proposed treatment area
Registered historic sites	Le Petit Trianon: 0.8 miles Woodhills: 1.9 miles Miller--Melone Ranch: <2.0 miles Picchetti Brothers Winery: 2.9 miles Hutton, Warner, House: 3.2 miles Saratoga Foothill Club: 3.6 miles Masson, Paul, Mountain Winery: 3.7 miles Villa Montalvo: <4.0 miles Welch-Hurst: 5.0 miles
Nearest international seaport	San Francisco Harbor: 47.0 miles
Nearest Native American area	Lytton Rancheria: 59.0 miles Lands within program area were ceded by <ul style="list-style-type: none"> • Picayune Rancheria of Chukchansi Indians of California • Santa Rosa Indian Community of the Santa Rosa Rancheria, California • Table Mountain Rancheria of California • Tule River Indian Tribe of the Tule River Reservation, California • Tuolumne Band of Me-Wuk Indians of the Tuolumne Rancheria of California

Table continued on next page.

Designated Land Use	Distance Rounded Off to Nearest Tenth of a Mile
Organic farms and farmers markets	8 farms and 4 markets within proposed treatment area
Schools and academic institutions	31 within proposed treatment area

* See appendix B for data sources.

California freeways passing through the program area include Interstate 280 and State Routes 9, 82, and 85. Schools, municipal parks, biking and hiking trails, golf courses, and other public and private recreational facilities also occur within or near the program area. OFF host vegetation in the program area occurs primarily on residential property.

b. Water Resources

Severe drought conditions since 2012 led to unusual surface and ground water loss. Both short-term (i.e., less than 6 months' duration) and long-term adverse impacts are predicted for California's agriculture, ecology, and hydrology (Mason, 2014; Tinker, 2015). The map in figure 2 shows the range of drought intensity across California.

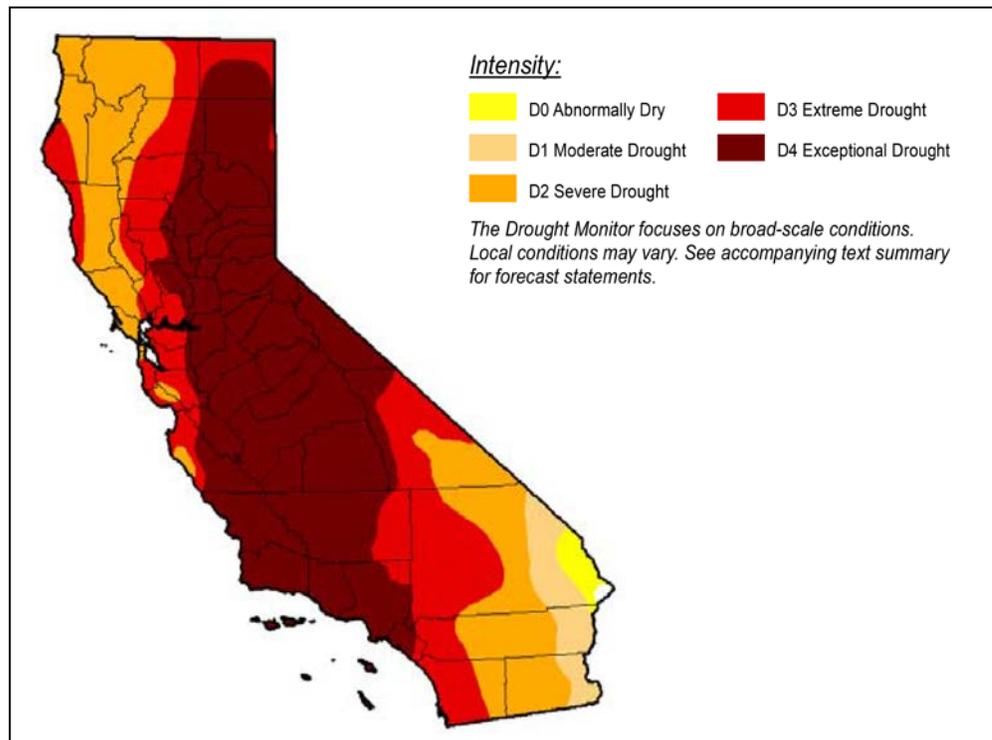


Figure 2. Drought status in California as of June 23, 2015.
(Tinker, 2015)

Santa Clara County obtains electric power, irrigation and drinking water from various sources. Although some local streams and rivers have been

developed to provide drinking water, much of the region’s surface water is imported from the Mokelumne, Tuolumne, Sacramento and Feather rivers. The Central Valley Project and the State Water Project’s South Bay Aqueduct supply water to Santa Clara County, but nearly half of all water used comes from groundwater (WEF, 2014; SCVWD, 2015). Fifty-one different types of wetlands are found within 15 miles of the program area, ranging from freshwater creeks and lakes to sloughs and estuaries. Water located beneath the program area or that drains off it may enter two local watersheds: Calabazas Creek-Frontal San Francisco Bay Estuaries, or Saratoga Creek. See table 3 for distances between the OFF program and certain water resources.

Table 3. Distance from center of proposed program area to water resources.*

Type of Resource	Distances Rounded Off to Nearest Tenth of a Mile
Aquifers and Subbasins	Santa Clara Subbasin is underneath the program area. Santa Margarita Aquifer, Scotts Valley SSA: 12.0 miles Lagas Subbasin: 29.3 miles
Surface water bodies	Regnart Creek: <0.5 mile Calabazas Creek: <1.0 mile Prospect Creek: 1.0 mile Stevens Creek: 1.1 miles Stevens Creek Reservoir: 2.0 miles
Impaired waters within 15 miles	CAL2054005020080714115011 (Almaden Lake): 10.4 miles CAL2054004019980928155642 (Guadalupe Reservoir): 11.8 miles CAR2024002020010905115819 (Pomponio Creek): 14.9 miles
Wetland habitat	Approximately 10 acres: including freshwater emergent wetland, freshwater forested/shrub wetland, ponds, etc.

* See appendix B for data sources.

In 1985 California enacted legislation to protect the potability of its ground water; potential contaminants are identified and pesticide use restrictions are implemented for vulnerable areas (State of California, 2014). Ongoing surveys of California’s waters continue to show substantial pollutant and toxicity levels; percentage increases, however, may reflect more thorough site assessment than increasing pesticide discharge and runoff (EPA, 2012).

The OFF eradication program calls for highly localized chemical applications in designated properties and no-spray buffers around all sensitive areas, including all water bodies. This method of application is designed to minimize the potential for introduction of program chemicals to local water resources.

2. Human Health

The principal concerns for human health are related to the program use of chemical pesticides including naled lure, spinosad protein bait, and methyl bromide (a fumigant). Naled is toxic to humans, birds and invertebrates. Spinosad is toxic to specific invertebrate species but is considered to be nontoxic to humans and other animals. The methyl eugenol attractant used as a lure is considered low hazard to human health (APHIS, 2014). Limited data exists regarding the toxicity of the protein hydrolysate, however available data suggests low acute toxicity to human health. Three major factors influence the human health risk associated with pesticide use, including fate of the pesticides in the environment, their toxicity to humans, and their exposure to humans.

Exposure to program pesticides can vary, depending upon the pesticide and the use pattern. The OFF eradication program will initially employ naled lure bait stations and traps, and ground-based targeted applications of spinosad bait. Potential exposure to naled is expected to be low because treatments are limited to spot applications of the pesticide formulation to areas of non-food plants, fence posts, utility poles and other inanimate surfaces that are not readily accessible to the general public. Commercial applications, should they become necessary, will be applied to properties owned by commercial growers and producers where exposure to the general public is unlikely. If spinosad bait application is restricted to target surfaces and made in accordance with EPA label instructions, effects to human health and the environment are expected to be incrementally negligible, and in cases where spinosad is used as a replacement for naled, are likely to be beneficial (Vargas et al., 2009). The use of methyl eugenol or protein hydrolysate as attractants in the OFF program will also result in a low risk to human health. The attractants have a low toxicity and their method of application results in a low probability of exposure and risk to workers and the general public.

Should treatment by methyl bromide fumigation be indicated, adherence to EPA label restrictions and application in enclosed areas or containers will protect applicators and the general public from risk of exposure to the fumigant (APHIS, 2007 and 2002).

The analyses and data of EIS1 and EIS2 and the associated human health risk assessments indicate that exposures to pesticides from normal program operations are not likely to result in substantial adverse human health effects. (Refer to EIS1 and EIS2 (APHIS, 2001 and 2008) and the human health risk assessments (APHIS, 2014, 1999 and 1998a) for more detailed information relative to human health risk.)

Another mitigation measure designed to minimize exposure of humans to program pesticides is the requirement for public notification. Information concerning the OFF eradication project will be shared via press releases

and media announcements to the general public. Either the county agricultural commissioner or public information officer will serve as the primary contact to the media. Any resident with property to be treated will be notified in writing at least 48 hours prior to treatment. Following the treatment, notices will be left with homeowners detailing precautions to take and safe intervals of time that should elapse before harvesting fruit on the property. Treatments are repeated at 7-14 day intervals for one life cycle of the fly (typically one to two months, sometimes longer dependent on temperature) (CDFA, 2015f).

APHIS recognizes that a small portion of the population may have greater than usual sensitivity to certain chemicals, and that program treatments may pose higher risk for these individuals. Special communication strategies to mitigate this risk are discussed in detail in appendix C of EIS1 (APHIS, 2001).

Should strong wind or rainfall be forecast for the program area, trap placement and chemical applications may need to be rescheduled. Site inspections will continue to ensure that existing program treatments are not likely to affect humans. The destruction or relocation of traps and treatments due to weather events is unlikely to result in adverse impacts to the human environment, as the potential toxicity should be greatly reduced by dilution in the storm's water and air.

In general, a well-coordinated eradication program using IPM technologies results in the least use of chemical pesticides, and minimizes their potential to adversely affect human health. A no-action alternative is not expected to eliminate OFF as readily or as effectively as the eradication alternative. Over a protracted period of no action, there would likely be broader and more widespread use of pesticides by homeowners and commercial growers, with correspondingly greater potential for adverse impacts to human health.

3. Other Aspects of the Human Environment

APHIS summarizes its findings on potential environmental impacts of implementing the action alternatives on historic sites, minority and/or low-income communities, and tribal interactions in the proposed quarantine program area in this section.

The National Historic Preservation Act of 1966, as amended (16 U.S. Code § 470 et seq.), requires Federal agencies to consider the impact on properties included in, or eligible for inclusion in, the National Register of Historic Places (36 Code of Federal Regulations §§ 63 and 800). APHIS determined its fruit fly eradication programs are undertakings with no potential to affect historic properties. The California State Historic Preservation Office concurred with this finding for the Mediterranean fruit fly program in Riverside County on January 20, 2015 and again for the guava fruit fly program in Los Angeles County on June 2, 2015. APHIS is

initiating a similar consultation for this outbreak. There are 104 registered historic sites in Santa Clara County. Of the eight historic sites located within the proposed quarantine zone (none in the treatment core), all are buildings with associated landscaping. In general, APHIS' fruit fly eradication programs are compatible with the preservation of historic sites because control activities are inconspicuously integrated into the site, do not disturb the ground, do not affect human-made structures, and APHIS restricts program treatments and activities to an as-needed basis. Of the 104 Federally Registered Historic Sites in Santa Clara County, the vast majority are buildings (houses, hotels, schools, churches, libraries) with surrounding horticultural plantings. There are three wineries, a garden, a horse barn, and a ranch of agricultural interest in Santa Clara County. Program activities will reduce potential pest effects on vegetation at all these locations and enhance their value.

In this program, APHIS intends to use bait treatments and, when necessary, fruit stripping by hand. Produce at farmer's markets will be inspected, and infested fruit may be confiscated and destroyed. APHIS will not conduct aerial chemical applications; spraying will be ground-based, targeted directly to foliage.. If APHIS discovers any archaeological resources, the appropriate individuals will be notified.

Federal agencies identify and address disproportionately high and adverse human health or environmental effects of its proposed activities, as described in Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Using the 2010 Census Bureau estimates, in the 15-mile area around the quarantine zone in Santa Clara County, approximately 11 percent of the population identified itself as speaking English "not well" or "not at all" (USCB, 2015). This area of the City of Cupertino has approximately 13 percent of its residents with a household income base less than \$25,000, and only 7 percent report less than a 9th grade education. The population reporting their race as Black is about 4 percent, Asian as 31 percent, and Hispanic as 26 percent. This demographic information does not suggest low-income and minority residents would require additional outreach to ensure adequate understanding of the program. Consequently, APHIS finds additional outreach to these segments of the population is not needed. Because the preferred method of bait/pesticide application is to use poles above the height humans can reach unassisted, these segments of the population are not likely to be disproportionately adversely affected by the bait/pesticide treatments or their methods of application.

Federal agencies comply with Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. The preferred alternative does not pose any disproportionate adverse effects to

children because maintenance of traps and any pesticide applications would not occur when children are present in the immediate area. Although there are approximately 30 schools located within the treatment areas, bait stations will not be placed on school property. Any exposure of children to applied products is negligible based on the program's application methods and the product formulations.

Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, calls for agency communication and collaboration with tribal officials when proposed Federal actions have potential tribal implications. Using the Native American Graves Protection and Repatriation Act Online Databases (NPS, 2014; 25 U.S. Code § 3001 et seq.), APHIS finds the nearest Federal reservation is more than 55 miles from the treatment area and there are no registered Native American Tribes residing in Santa Clara County. Only federally recognized Tribes are able to participate in Section 106 consultation. There are five federally recognized tribes who ceded lands that are within the treatment and quarantine zones (Picayune Rancheria of Chukchansi Indians, Santa Rosa Indian Community of the Santa Rosa Rancheria, Table Mountain Rancheria of California, Tule River Indian Tribe of the Tule River Reservation, and the Tuolumne Band of Me-Wuk Indians of the Tuolumne Rancheria of California). APHIS will provide these tribes information about the Fruit Fly Cooperative Eradication Program. Individual tribal members living within the quarantine zone will not be disproportionately affected in comparison to other individuals in the area because eradication treatments are applied to the foliar canopy located in the 200 meters around an OFF detection, or applied to poles above the unassisted reach of most humans. The proposed action will not disturb the ground, so it is unlikely to affect Native American sites or artifacts. For these reasons, APHIS does not expect any tribal members to be directly affected by program activities. If fruit fly detections warrant expansion of the program area onto tribal lands, program officials will initiate consultation. A lack of Federal action could result in adverse economic and health impacts on affected producers and consumers, such as decreased harvests, higher consumer prices, loss of local employment, reduced nutritional options, loss of market share, compromised mental and physical health, loss of property, and so on. These indirect impacts are expected to occur to a lesser extent under the quarantine and commodity certification alternative. Adverse effects are not anticipated as a result of carrying out the preferred alternative's surveillance activities, trapping, SIT, or program chemical applications.

4. Nontarget Species

The principal concerns for nontarget species, including threatened and endangered species, relate to potential harm from the use of program pesticides to eradicate OFF populations. Paralleling human health risk, the risk to nontarget species is related to the pesticides' fate in the environment, their toxicity and exposure to nontarget species. APHIS'

fruit fly control programs are designed to prevent the introduction of program chemicals into nontarget areas.

All of the pesticides considered in this EA are highly toxic to invertebrates, even though the likelihood of exposure (and any ensuing impacts) varies among the pesticides and with the specified use pattern. In general, a well-coordinated OFF eradication program using IPM technologies would result in the least use of chemical pesticides, overall, with minimal adverse impacts to nontarget species. The no action alternative is less likely to be effective at eliminating OFF, and would be expected to result in broader and more widespread use of pesticides by homeowners and commercial growers, with a correspondingly greater potential for adverse impacts.

Should strong wind or rainfall be forecast for the program area, trap placement and chemical applications may need to be rescheduled. Site inspections will continue to ensure existing program treatments are not likely to affect nontarget organisms. The destruction or relocation of traps and treatments due to weather events is unlikely to result in adverse impacts to animal species and their habitats, as the potential toxicity should be greatly reduced by dilution in water and air.

The MAT portion of the OFF eradication program will employ a naled or spinosad formulation. The pesticide naled is practically nonpersistent in the environment, with reported field half-lives of less than 1 day. It rapidly degrades in the presence of sunlight and is not strongly bound to soils. It is rapidly broken down if wet (a reported half-life of about 2 days), and it is moderately volatile (Extoxnet, 1996). (See below for a discussion of the pesticide spinosad.) Potential exposure of nontarget species to naled and spinosad are expected to be low because treatments are limited to spot applications of pesticide to areas of non-food plants, fence posts, utility poles, and other inanimate surfaces that are not readily accessible to most nontarget species.

Methyl eugenol (ME), the lure ingredient in the MAT formulation, is considered moderately toxic to mammals if ingested, and can attract certain nontarget invertebrates (APHIS, 2014). The attractant used in the OFF bait stations poses a slight risk to certain terrestrial invertebrates that are attracted to the bait due to the presence of ME, and they could receive a lethal dose of naled or spinosad. However, based on the selective nature of the attractant, the impacts would be localized and transient, and are not anticipated to result in population level effects to sensitive taxa, including beneficial arthropods.

The eradication program will also apply a targeted, ground-based foliar bait treatment if evidence of a breeding OFF population is detected. For

this, host trees and plants within a 200-meter radius of the OFF find site are treated with a highly localized spray that consists of an organic formulation of the pesticide spinosad combined with protein hydrolysate bait.

Protein hydrolysate is a common attractant used in fruit fly treatments, increasing the efficacy of chemical applications and reducing the area of pesticide treatments needed for control (Prokopy et al., 1992). OFF are attracted to the protein hydrolysate where they then receive a lethal dose of the pesticide (spinosad) that is mixed with the attractant. The protein hydrolysate is expected to have minimal impacts to environmental quality based on its use pattern and rapid degradation. The protein is not expected to result in impacts to nontarget species.

The pesticide spinosad has low to moderate toxicity to wild mammals and birds. Spinosad toxicity to fish is moderate while aquatic invertebrates are more sensitive in acute and chronic exposures. Toxicity to terrestrial invertebrates is variable; however, spinosad is considered highly toxic to honey bees. Risks to nontarget fish and wildlife are anticipated to be negligible based on the proposed use pattern that would result in a low potential for exposure to most taxa. A favorable environmental fate profile and low toxicity to most nontarget organisms further reduces the risk to terrestrial and aquatic animals (APHIS, 2014).

For the fumigant methyl bromide, the sealed methods for its application are designed to protect nontarget species by preventing their exposure to the pesticide (APHIS, 2007 and 2002). Potential cumulative impacts of methyl bromide released to the global environment are considered in section 6 of this chapter.

Sites near the program area that might require special consideration, should the program area expand, include habitat for federally listed species, valley and foothill grasslands, riparian areas (including marshes and swamps), or other aquatic areas. No program chemical applications will be permitted at these sites or other protected areas. Fruit survey and surveillance trapping will continue, and fruit stripping by hand will be undertaken if OFF detections occur at such locations.

a. Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 U.S. Code §§ 703–712) established a Federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive

for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.

Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a memorandum of understanding with the U.S. Fish and Wildlife Service (FWS) that promotes the conservation of migratory bird populations. On August 2, 2012, an MOU between APHIS and FWS was signed to facilitate the implementation of this Executive order.

Approximately 400 species of birds have been documented in Santa Clara County (Bousman, 2005). Birds of conservation concern in the area include: Allen's hummingbird (*Selasphorus sasin*), Bell's sparrow (*Amphispiza belli*), black oystercatcher (*Haematopus bachmani*), black swift (*Cypseloides niger*), burrowing owl (*Athene cunicularia*), Costa's hummingbird (*Calypte costae*), fox sparrow (*Passerella iliaca*), Lawrence's goldfinch (*Carduelis lawrencei*), lesser yellowlegs (*Tringa flavipes*), Lewis' woodpecker (*Melanerpes lewis*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), Nuttall's woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), olive-sided flycatcher (*Contopus cooperi*), peregrine falcon (*Falco peregrinus*), short-billed dowitcher (*Limnodromus griseus*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsonii*), tricolored blackbird (*Agelaius tricolor*), whimbrel (*Numenius phaeopus*), yellow warbler (*Dendroica petechial* ssp. *brewsteri*), and red knot (*Calidris canutus* ssp. *roselaari*) (USFWS, 2015). Many of these species are winter visitors in the area and would not currently be present.

APHIS evaluated the proposed OFF program in terms of potential impact on migratory avian species. Given the extent of urbanization within the treatment area and the methods of application, implementation of the preferred alternative is not expected to have any adverse effect on migratory birds or their flight corridors. The proposed program would not involve removal or disturbance of any trees, shrubs, or other vegetation on the project site that could be used by birds. In addition, birds would not be exposed to program treatments because of the targeted nature of the applications.

b. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) and ESA's implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to ensure that their actions are not likely to jeopardize the continued existence of

threatened or endangered species or result in the destruction or adverse modification of critical habitat.

APHIS reviewed the program area for potential co-occurrence of federally listed species and critical habitat to determine if any proposed program treatments may affect listed species or critical habitat. Three federally listed species occur within or near to the spinosad treatment and MAT area; the threatened California red-legged frog (*Rana draytonii*), the threatened Central California Distinct Population Segment (DPS) of the California tiger salamander (*Ambystoma californiense*), and the threatened Central California Coast steelhead DPS (*Oncorhynchus mykiss*) and its designated critical habitat. APHIS entered into informal consultation with FWS for the frog and salamander, and with NMFS for the steelhead and its critical habitat. APHIS determined that the OFF eradication program may affect, but is not likely to adversely affect these species or critical habitat. With the implementation of treatment buffers for spinosad and naled baits, FWS and NMFS concurred with these determinations in letters dated July 1, 2015.

The FWS concurred with the determination that the proposed project is not likely to adversely affect the California redlegged frog and Central California tiger salamander because: (1) no suitable upland or aquatic habitat for these listed amphibians will be treated; (2) no naled treatments will occur within 60 feet of suitable aquatic or riparian habitat; (3) no spinosad treatments will occur within 30 feet of suitable aquatic or riparian habitat; (4) no treatments will occur within 48 hours of a rain event; (5) appropriate pesticide use best management practices will be implemented to avoid pesticide drift and contamination of suitable habitat; (6) the treatment is very targeted to OFF and would not cause reductions in the availability of invertebrate prey for the California red-legged frog and Central California tiger salamander; and (7) potential exposure of non-target species to naled are expected to be low because treatments are limited to spot applications of the bait to areas of non-food plants, fence posts, utility poles, and other inanimate surfaces that are not readily accessible to most non-target species.

The NMFS concurred with the determination that the proposed project is not likely to adversely affect the Central California Coast steelhead DPS or its critical habitat because: (1) spinosad breaks down rapidly in water, is not considered mobile in soils, and is not thought to be an endocrine disruptor, (2) spinosad will be applied manually (hand-held or backpack sprayer) and at low application rates; (3) spinosad will not be used if rain is expected within 48 hours of an application event; (4) spinosad will not be applied within 30 feet of any aquatic habitat in the treatment zone, which will inhibit the transfer of the pesticide into Stevens, Regnart, and Prospect creeks; (5) no MAT treatments using naled will occur within 60

feet of aquatic habitat; (6) no more than 600 MAT stations will occur within the treatment zone; and (7) MAT stations will be located at least 6 feet off the ground and will be attached to fixed objects.

Should the program area expand or further outbreaks be detected, APHIS will reinitiate consultation with FWS and NMFS, as necessary. A complete administrative record of this review is available upon request.

c. Magnuson-Stevens Fishery Conservation and Management Act (MSA)

Under the MSA, consultations are intended to promote the protection, conservation and enhancement of essential fish habitat (EFH) as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 § CFR 600.10), and "adverse effect" means any impact which reduces either the quality or quantity of EFH (50 CFR § 600.910(a)). Adverse effects may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Based on information provided by APHIS, NMFS determined that the proposed action may result in impacts to aquatic invertebrates due to toxicity exposure. Therefore, NMFS has determined the proposed action would adversely affect EFH. However, avoidance and minimization measures have been included to reduce potential impacts as described in the ESA section above.

APHIS must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH (50 CFR § 600.920(1)).

5. Environmental Quality

The principal environmental quality concerns are for the protection of air quality, water quality, and the minimization of the potential for environmental contamination. In relation to preserving environmental quality, program pesticides remain the major concern for the public and the program. Although program pesticide use is limited, especially in comparison to other agricultural pesticide use, the proposed action would result in a controlled release of chemicals into the environment. The fate of those chemicals varies with respect to the environmental component (air, water, or other substrate) and its characteristics (temperature, pH, dilution, etc.). The environmental fates of naled, spinosad, methyl eugenol and methyl bromide are outlined below. Refer to EIS1 and EIS2 (APHIS, 2001 and 2008) and the risk assessments (APHIS, 2014, 2003,

1998a and 1998b) for a more detailed consideration of program pesticides' environmental fates. The protein hydrolysate is expected to have minimal impacts to environmental quality based on its use pattern and rapid degradation and would not result in impacts to environmental quality beyond those described for the below chemicals.

- **Naled** is practically nonpersistent in the environment, with reported field half-lives of less than 1 day. It rapidly degrades in the presence of sunlight. Naled is not strongly bound to soils. It is rapidly broken down if wet (a reported half-life of about 2 days), and it is moderately volatile. Soil microbes break down most of the naled in the soil; therefore, it should not present a hazard to ground water. The half-life of naled on foliage ranges from 2.3 to 2.5 days. Plants remove bromine from naled to form dichlorvos, which may evaporate or be further metabolized (Exttoxnet, 1996).
- **Spinosad** is not considered mobile in soil: it adsorbs strongly to soil particles and is unlikely to leach to great depths. Dissipation half-lives for spinosad in the field may last 0.3 to 0.5 day. It is photodegraded quickly on soil exposed to sunlight. Spinosad is quickly metabolized by soil micro-organisms under aerobic conditions, and has a half-life of 9.4 to 17.3 days. Spinosad is not sensitive to hydrolysis, but aqueous photolysis is rapid in natural sunlight (half-life of less than 1.0 to 1.6 days), and is the primary route of degradation in aquatic systems exposed to sunlight. Under anaerobic conditions, the degradation rate is slower, between 161 and 250 days. Spinosad has a half-life of 2.0 to 11.7 days on plant surfaces. After initial photodegradation, residues are available for metabolism by plant biochemical processes. Effects from residues of individual treatments are no longer detectable in environmental substrates within a few weeks of application (APHIS, 2014; Kollman, 2003).
- **Methyl eugenol (ME)** is a volatile compound. In the atmosphere, ME is degraded by reaction with hydroxyl radicals. ME is not expected to undergo hydrolysis in the environment. In water it adsorbs moderately well to suspended solids and sediment. ME is expected to have high mobility in soil. Dissipation of ME from soil and from water is slower in colder temperatures. Half-lives of ME are estimated to be 5 hours in the atmosphere, 8 days in soil, 8 days in water, and 32 days in sediment (APHIS, 2014).
- **Methyl bromide (MB)** will not be used as an eradication treatment, but may be employed as a regulatory treatment. MB volatilizes into air from soil and water, and is known to contribute to stratospheric ozone depletion. The volatilization half-life for MB from surface water ranges from 3.1 hours to 5 days. The degradation half-life of MB in

water ranges from 20 to 38 days, depending on temperature and pH. Volatilization of MB from surface soil is rapid, with a half-life ranging from 0.2 to 0.5 days. The degradation half-life of MB in soil ranges from 31 to 55 days. MB has a low affinity to bind to soils, but is not considered a major contaminant of ground water (NPIC, 2000). The small quantities used to treat for OFF disperse when fumigation chambers are vented. See section 6 of this chapter regarding MB's potential cumulative impacts to the environment.

Urban and agricultural runoff may flow directly into local waters, picking up trash, dirt, chemicals, and other contaminants along the way. If treatment is indicated in close proximity to a body of water, where pesticides may be directly discharged into the water, CDFA will analyze the environmental setting and establish site-specific best-management practices to follow. The prescribed method of spray application directly to host plants is designed to minimize drift and runoff. Mitigation measures will be applied to protect marine and freshwater resources. Personnel will maintain a minimum distance of 98 feet (30 meters) from surface water and when applying pesticides will adhere to label direction, State and Federal laws, and recommendations of environmental compliance staff. Water body contact is not anticipated in *Bactrocera* spp. programs.

The alternatives were compared with respect to their potential to affect environmental quality. Risk to environmental quality is considered minimal for the preferred alternative. Again, a well-coordinated eradication program using IPM technologies would result in the least use of chemical pesticides overall, with minimal adverse impacts on environmental quality. The no action alternative would likely result in broader and more widespread use of pesticides by homeowners and commercial growers, with correspondingly greater potential for adverse impacts.

The proposed program area was examined to identify characteristics that would tend to influence the effects of program operations. Potentially sensitive areas were identified, considered, and accommodated, as necessary, through special selection of control methods and use of specific mitigation measures. Allowances were made for the special site-specific characteristics that would require a departure from the standard operating procedures. The approaches used to mitigate for adverse impacts to bodies of water are described in EIS1 (APHIS, 2001).

6. Cumulative Impacts

This section considers the potential of the alternatives to cause cumulative impacts on the human environment. Not taking Federal action is expected to result in the cumulative impacts that arise from tolerating uncontrolled OFF infestations in the United States. The quarantine and commodity certification alternative places the burden of control efforts and expense on

producers already engaged in complying with other quarantine and commodity certification requirements. Also, this alternative may increase the time it takes for commodities to reach their intended markets, or may prevent them from reaching consumers at all, which may contribute to negative public perception of the affected industry.

APHIS considered implementation of the preferred alternative in the context of, and in conjunction with, other pest insect eradication and quarantine projects in the Cupertino program area (such as light brown apple moth and glassy-winged sharpshooter eradication efforts). The combination of different pesticide chemistries, targets for application, and application timings for these programs suggest interacting, or multiple exposures are not likely to create significant cumulative impacts in the human environment.

Current and future in-State OFF programs could potentially be merged into one larger program area. When an OFF eradication program is combined with trapping and eradication actions in other California counties, a beneficial cumulative impact on the environment is expected, namely, less OFF damage to fruit and fewer chemical treatments because of the reduction in the OFF population.

The OFF program for the Cupertino region was examined for potential synergistic and cumulative environmental impacts. Program pesticides approved for use against OFF are also prescribed treatments for other *Bactrocera* spp. programs. As of June 30, 2015, there are eight active treatment sites in California targeted at *Bactrocera* species: specifically, at Oriental, guava and peach fruit fly infestations in Los Angeles, Santa Clara, and San Mateo Counties (CDFA, 2015g). At this time none of the active treatment areas overlaps one another. Due to the passage of time and the prevailing weather conditions in Santa Clara County, no chemical residues are believed to remain from *Bactrocera* spp. programs that could result in additive or synergistic chemical effects with previous program chemical applications. Use of program pesticides in an OFF program that overlaps another *Bactrocera* spp. program should be monitored and adjusted, where necessary, to minimize environmental impacts.

No significant environmental impacts are expected to result from proper implementation of this OFF eradication and control program. The differences in pesticide chemistries, targets for application, affected species and resources, and application timing between the OFF program and other pest control programs in California are not likely to create significant cumulative impacts in the human environment. No synergistic or cumulative impacts from pesticide applications are expected with the following active programs (CDFA, 2015h)—

- Asian citrus psyllid in 16 counties including Santa Clara County;
- glassy-winged sharpshooter in 43 counties, including Santa Clara County.

Care should be taken when multiple pest species in the same area are targeted for treatment using the same chemical. Spinosad, for example, has other labeled food and non-food uses and is currently used in a variety of pest control efforts, including the control of termites and European grapevine moth (APHIS, 2014). Implementation of an OFF eradication program could lead to an increase in spinosad use and the possible overlap of APHIS and non-APHIS program treatments. The OFF treatment schedule will be adjusted in locations where another CDFA or APHIS program may have scheduled similar treatments, so as to avoid additive chemical impacts.

Additional programs in place at the time of preparation of this EA which may employ spinosad treatments (CDFA, 2015g) that could combine with OFF spinosad treatments to have a cumulative impact have been designed to target the following—

- Mexican fruit fly in Los Angeles and San Bernardino Counties;
- European grapevine moth in 31 California counties, including Santa Clara County;
- light brown apple moth in portions of many California counties, including portions of Santa Clara County.

It is uncertain how pesticides may be used by private entities in the OFF program area. In terms of Federal and California State program activity, there are no significant cumulative impacts anticipated as a consequence of implementing the preferred alternative or its component treatment measures. The preferred alternative is designed for pesticide applications to avoid overlapping treatment areas and to prevent nontarget exposure until pesticide residues have degraded.

APHIS determined uses of MB for fruit fly quarantine treatments pose negligible potential for cumulative impacts to the environment. For information on potential depletion of the ozone layer related to MB released into the atmosphere, see the *Rule for the Importation of Unmanufactured Wood Articles from Mexico, with Consideration for Cumulative Impact of Methyl Bromide Use, Final Environmental Impact Statement* (APHIS, 2002) and subsequent analyses, such as the *Importation of Solid Wood Packing Material, Supplement to the Final Environmental Impact Statement* (APHIS, 2007).

There were no residual impacts from previous Federal and non-Federal actions targeting fruit fly infestations in the State of California, and there

are no reasonably foreseeable future actions that could result in incremental increases in environmental effects. Based on APHIS' review of the context and intensity of the existing, ongoing, and potential future treatments, there will be no cumulative impacts to the human environment resulting from this OFF eradication program.

As discussed previously, additional actions may be implemented in this program, including additional quarantines and regulatory treatments. The anticipated use of these treatments is considered to pose minimal risk to the human environment, as determined in EIS1 and EIS2 (APHIS, 2001 and 2008), and the nontarget species and human health risk assessments (APHIS, 2014, 2003, 1999, 1998a, and 1998b).

IV. Agencies Consulted

California Department of Food and Agriculture
Plant Health and Pest Prevention Services
Environmental Policy and Compliance
1220 N Street, Room 221
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Pest Detection/Emergency Projects
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State Historic Preservation Officer
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Center for Plant Health Science and Technology
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental and Risk Analysis Services
4700 River Road, Unit 149
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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Western Region
777 Sonoma Avenue, room 325
Santa Rosa, CA 95404

U.S. Department of the Interior
Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, CA 95825

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USCB—See U.S. Census Bureau

USDA—See U.S. Department of Agriculture

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Appendix A. OFF Quarantine in Santa Clara County, California as of July 2, 2015



Source: USDA-APHIS-PPD

Appendix B. Outside-APHIS Spatial Data Resources Used to Prepare This Document

The following resources were used by USDA-APHIS-ERAS, 26-30 June 2015.

Web-Based Mapping Application for Environmental Assessments

- **NepaAssist:** <http://nepassisttool.epa.gov/nepassist/entry.aspx>

For Information on—

- **Bing Maps Road:** <http://www.esri.com/software/arcgis/arcgisonline/bing-maps.html>
- **Boundaries:** <http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Boundaries/MapServer>
- **Historic Sites:** <http://www.nps.gov/nr/>
- **Native American Areas:** <http://viewer.nationalmap.gov/>
- **Nonattainment Areas:** http://geoplatform2.epa.gov/arcgis/rest/services/PM_Designations_Mapping/Nonattainment_Areas/MapServer
- **Organic Farms:** <http://www.ams.usda.gov/AMSV1.0/nop>
- **Places:** <http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Places/MapServer>
- **Threatened and Endangered Species:** <http://www.dfg.ca.gov/biogeodata/cnddb/>
- **Transportation:** <http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Transportation/MapServer>
- **Water:** <http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Water/MapServer>