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Glassy-winged Sharpshooter Area Wide Management Program

**Fresno, Kern, Madera,
Riverside and Tulare Counties,
California**

**Supplemental Environmental
Assessment
October 2016**

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Tulare Counties, California**

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Table of Contents

I. Purpose and Need.....	5
II. Alternatives.....	7
A. No Action.....	7
B. Preferred Alternative.....	7
III. Affected Environment	10
A. Land Characteristics and Agricultural Production.....	10
B. Air Quality.....	12
C. Water Quality	12
D. Ecological Resources.....	13
IV. Environmental Impacts.....	16
A. No Action.....	16
B. Preferred Alternative.....	16
C. Cumulative Effects	20
D. Threatened and Endangered Species.....	20
E. Migratory Birds	21
F. Other Considerations.....	22
V. Listing of Agencies and Persons Consulted.....	24
VI. References.....	25

I. Purpose and Need

The glassy-winged sharpshooter (GWSS), *Homalodisca vitripennis* (Germar) (Hemiptera: Cicadellidae), formerly *Homalodisca coagulata*, is a leafhopper insect native to the southeastern United States and northeastern Mexico. GWSS transmits and spreads the bacterium *Xylella fastidiosa*. Strains of this bacterium cause disease to several host plants including grapes (Pierce's disease), citrus, stone fruits, almonds, alfalfa and oleander. The pathogen attacks the plant's xylem or water-conducting tissues and chokes the flow of water and nutrients within the plant, resulting in stress and eventual death of the plant.

The introduction of GWSS to California is a serious threat to the grape industry due to its ability to spread Pierce's disease. GWSS is present in 14 counties in California including Fresno, Imperial, Kern, Los Angeles, Madera, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Santa Clara, Tulare and Ventura (CDFA 2010a). All of the counties with GWSS have Pierce's disease except Imperial County, but not all of the counties with Pierce's disease have GWSS (CDFA 2010b). Additional counties are at risk of getting both GWSS and Pierce's Disease (Appendix A).

Xylella fastidiosa is not a quarantine pest in the United States and there are other insect vectors, including the less aggressive blue-green sharpshooter, that spread the bacterium. However, the presence and spread of GWSS in California, where it is regulated by the California Department of Food and Agriculture (CDFA), presents a greater threat to agriculture by increasing the incidence and severity of Pierce's disease because: (1) it moves faster and farther than other vectors of *X. fastidiosa*; (2) it has a much wider host range; (3) its breeding habits and hosts are different; and (4) it feeds on the larger (basal) stems of plants, making pruning away *X. fastidiosa* infections ineffective (CDFA 2011b).

The host list for GWSS is extensive, including at least 358 host plants (CDFA 2011a). Because of its wide host range and ability to vector the bacterium, GWSS threatens a wide variety of crops, ornamentals, and native plants in California with the grape and wine industries identified by state and federal scientists, and economists, as being under considerable risk. Pierce's disease kills or renders grapevines unproductive within two to three years. Pierce's disease caused the destruction of wine grape industries in Southern California and was responsible for the loss of 40,000 acres of grapes near Anaheim in the 1880s. More recently, "California's first indication of the severe threat posed by this new disease and vector combination occurred in Temecula, Riverside County, in August of 1999, when over 300 acres of grapevines infested with the glassy-winged sharpshooter were destroyed by Pierce's disease. Losses continued to

mount in Temecula and other infested areas in following years, eventually exceeding 1,100 acres statewide by 2002” (CDFA 2012). In 2014, California’s grape industry was around \$ 5.2 billion (CDFA 2015) and associated economic activity estimated at \$62 billion (CDFA 2012). In addition to potential losses to commercial agriculture and nursery crops, CalTrans has estimated that it could lose approximately \$52 million in oleander along 2,100 miles of freeway because oleander is a host to GWSS and susceptible to the bacterium. Potential losses to backyard fruit production and home ornamentals are more difficult to estimate, but are expected to be significant.

Accordingly, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS) is proposing to cooperate with the California Department of Food and Agriculture (CDFA), County Agricultural Departments, and local grower groups in an Area Wide Management Program for GWSS to reduce the impact to the grape industry in the counties of Fresno, Kern, Madera, Riverside and Tulare.

APHIS’ authority to cooperate in this program is based upon Title IV– Plant Protection Act, Public Law 106-224, 114 Stat. 438-455, which authorizes the Secretary of Agriculture to take measures to prevent the dissemination of a plant pest that is new to or not known to be widely prevalent or distributed within or throughout the United States. Authorities for CDFFA’s pest eradication and quarantine actions are based on Sections 407, 5301, 5302, and 5322, of the California Food and Agricultural Code. Authorities for actions against pests taken by California agricultural commissioners at the county level are based upon Sections 2271-2287 of the California Food and Agricultural Code.

This supplemental environmental assessment (EA) has been prepared in compliance with APHIS' National Environmental Policy Act of 1969 implementing procedures (Title 7 of the Code of Federal Regulations, part 372). This supplemental EA considers the potential effects on the human environment should APHIS either take no action or implement an area wide management program to control the spread of GWSS in five counties within the state of California. This document supplements the EA that was published in August 2015 that was prepared to address new control options and an expansion of the GWSS program to five counties. This supplemental EA is being prepared in order to add two additional insecticides to the list of control alternatives, flupyradifurone and cyantraniliprole. These products are needed to provide growers with additional new control methods for the GWSS.

II. Alternatives

Alternatives considered for this program include (1) no action, and (2) an expansion of available control measures (proposed alternative).

A. No Action

The no action alternative in this supplemental EA are the baseline conditions that currently exist for the program and are described in the preferred alternative in the August 2015 EA.

B. Preferred Alternative

APHIS and the CDFA are currently engaged in a statewide Pierce's Disease Control Program (PDCP) that is targeted at slowing or stopping the spread of the GWSS and Pierce's disease in California. CDFA regulates the shipment of host plants and other host material to prevent the spread of GWSS into new areas of the State. The no action alternative would be characterized by no change to APHIS support of control activities for GWSS. The current CDFA PDCP control strategy relies on five elements to stop or slow the spread of the GWSS until long-term solutions are developed for Pierce's disease (CDFA 2012). The four elements summarized below represent the No Action Alternative. Details of the strategy are found in CDFA's Pierce's Disease Control Program's 2012 Annual Report to the Legislature (last accessed September 26, 2013, <http://www.cdfa.ca.gov/pdcp/>):

1. **Statewide Survey and Detection**
CDFA monitors GWSS infestations and populations through the use of traps and visual detections. The Survey and Detection element of the program is designed to locate new infestations of GWSS and verify non-infested areas remain free of the pest. Survey for GWSS currently occurs in 43 counties that are not infested or partially infested. Surveys focus on trapping in urban, residential and nursery settings. APHIS provides funding for the surveys conducted in each county.
2. **Rapid Response and Treatment**
When one or more GWSS are found in a new area, delimitation surveys are conducted by the County to determine if an infestation is present, and if so identify the boundaries of the infestation. APHIS provides funding support for the delimitation surveys. If an infestation is confirmed (i.e. five or more adult GWSS within a radius of 300 yards within a five-day period, or multiple life stages detected at a given time), treatments are conducted by PDCP personnel and County cooperators in urban settings; in agricultural settings individual growers are responsible for treatments in a manner that is approved and

supervised by the County Agricultural Commissioner. APHIS does not provide funding support for pesticide treatments in urban settings, nor does the Agency coordinate or administer these pesticide treatments.

Area-wide management programs coordinate insecticide treatments in commercial citrus blocks around grapes and other commodities to control GWSS. Current area-wide management programs occur in Kern County (USDA 2002b). Area-wide management programs are done cooperatively between County Agricultural Commissioners and the CDFA. CDFA's Pierce's Disease Control Program's 2012 Annual Report to the Legislature summarizes the trapping and survey activities and insecticide treatment activities that occurred under these area-wide management programs.

3. Outreach

The CDFA and the PDCP recognize the importance of engaging the public and growers about the management program for Pierce's disease and its vectors including GWSS. The outreach efforts are intended to inform stakeholders about the importance of these pests and to explain the management strategies available for controlling GWSS and Pierce's disease. APHIS is not directly involved in CDFA's outreach campaigns, but does produce information about GWSS and Pierce's Disease that is available to the public.

4. Research

CDFA, USDA, the University of California and the California State Universities, together with other state and local agencies, industry and agricultural interests continue to engage in research to understand the spread of Pierce's disease and control methodologies to slow or stop its spread.

Under this alternative, APHIS would continue to cooperate with the California Department of Food and Agriculture (CDFA), County Agricultural Departments and local grower groups in a comprehensive strategy to reduce (but not eradicate) populations of GWSS in Fresno, Kern, Madera, Riverside and Tulare counties.

APHIS will continue to provide financial reimbursement to growers who make pesticide treatments to GWSS-infested commercial citrus trees and surrounding citrus orchard windbreaks (Kern County only) that are adjacent to commercial grape vineyards. GWSS migrates to citrus trees when grapevines go dormant during the winter months. The two advantages to applying pesticides when GWSS migrate to citrus are 1) Only one crop is being treated, reducing the number of acres on which pesticides are applied and the amount of pesticides used; and 2) GWSS populations naturally decline in the winter which may make it possible to

disrupt the spatial distribution of the GWSS populations enough to reduce mating to the extent that the population will be substantially diminished. This, in effect, will reduce the potential for migration into adjacent crops (especially grapes) or to other distant production areas. Although GWSS is present in 14 counties in California, APHIS would only be involved in area wide management in Fresno, Kern, Madera, Riverside and Tulare counties. These counties were selected over other infested counties based on the land area dedicated to the commercial production of grapes and citrus. In addition to financial support, the proposed action would implement a coordinated management program in such a way as to minimize the usage of pesticides. In addition the program incorporates mitigative actions to prevent adverse effects to any waterbodies or residential properties that may occur in the proposed treatment areas.

Under the GWSS area-wide management program, growers consult with program managers and are able to choose the appropriate control measures, based on their individual needs. The EPA-registered and APHIS-approved pesticides identified for use in the Program are chlorpyrifos, cyfluthrin, methomyl, pyrethrin (+piperonyl butoxide), imidacloprid, acetamiprid, dinotefuron, carbaryl and thiamethoxam.

The preferred alternative would include all of the management options described above plus the addition of the insecticides, flupyradifurone and cyantraniliprole. These products would be added to the list of approved insecticides to provide growers additional control measures for the GWSS.

III. Affected Environment

The GWSS area-wide management program described under the preferred alternative would cover five counties, specifically commercial citrus orchards collocated with commercial grape vineyards. Much of the affected environment occurs on or near land zoned for agricultural production. The GWSS area-wide management program includes the use of chemical pesticides to manage GWSS. Because of this, the affected environment may involve air, soil, and water quality and may affect neighboring counties that share air and water pathways. The below affected environment section is the same that was discussed in the August 2015 EA that was prepared for the GWSS program.

A. Land Characteristics and Agricultural Production

Agriculture is important to the economy of the five counties that would be part of the GWSS Area Wide Management Program. In 2014, the five counties within the proposed program area harvested nearly 1.3 million acres of possible host commodities for GWSS, and reported over \$ 26.4 billion in gross agricultural production . Three of the five counties boast the highest yields of grapes (wine, table, and dried) (Kern, Fresno, and Tulare) and almonds in California (Kern, Fresno, and Madera (CDFA 2015)). In addition, Tulare, Kern, Fresno, Ventura, and Madera produce over 95 percent of the oranges in the State.

Fresno County

Fresno County covers approximately 6,000 square miles of central California and is located near the center of California's San Joaquin Valley which, together with the Sacramento Valley to the north, forms the Great Central Valley.

Fresno County is one of the most productive and diverse agricultural areas in the United States. According to the USDA NASS 2007 Census of Agriculture, 978,948 acres of cropland (equivalent to 1,500 square miles or 25 percent of the county's land cover) were harvested in 2007 (USDA 2007). In 2006, the agriculture sector contributed \$4.8 billion to Fresno County's economy – 67 percent of which was attributed to vegetable, fruit, and nut crops. Around 40,000 acres of citrus were harvested for a value of ca. \$211 million. Grapes were ranked the top crop - grown on 198,458 acres for a value of \$562 million (Fresno County 2006). Organic farms cover nearly 41,000 acres; their agricultural production value for 2011 was just over \$131 million (CDFA 2012).

Kern County

Kern County is located at the southern end of California's Central Valley and covers 8,171 square miles. In 2011, 870,909 acres of cropland

(equivalent to 1,361 square miles or 17 percent of the county's land cover) were harvested (Kern County 2011). In 2011, Kern County's agricultural crop production was valued at \$4.2 billion, ranking third among the highest-producing counties in the state. Citrus was grown on over 55,000 acres; grapes on 82,624 acres. The economic value of citrus was \$540 million; grapes \$707 million. In addition, the county has 75 registered organic farms, some of which grow citrus and grape (Kern County 2011).

Madera County

Madera County covers approximately 2,147 square miles in the geographic center of California; bordered on the north by the Chowchilla River and on the south by the San Joaquin River. The county includes some of the richest agricultural land in the nation. In 2011, 669,490 acres of cropland (equivalent to 1,046 square miles or 49 percent of the county's land cover) were harvested (Madera County 2011). Of this, 6,200 acres were dedicated to organic farming, on which commodities that are hosts to GWSS were grown, including grape and almond (Madera County 2011).

Madera County's commercial citrus groves occupy 3,400 acres in the central valley portion and brought in \$13 million in 2011 (Madera County 2011). Almonds are its single most valuable agricultural commodity, bringing in \$400 million (Madera County 2011). In 2011, grapes were produced on 74,450 acres and were valued at \$300 million. The value of organic production in 2011 was \$16 million.

Riverside County

Riverside County is comprised of over 7,200 square miles of river valleys, deserts, mountains, foothills and plains, and extends from within 14 miles of the Pacific Ocean to the border with Arizona along the Colorado River. Over 209,710 acres are dedicated to cropland (equivalent to 328 square miles or around 5 percent of the county's land cover) (Riverside County 2011).

In 2011, the citrus, almonds, grapes, and stone fruit production was valued approximately \$348 million; table grapes and citrus ranked among the top 10 agricultural commodities grown. In 2011, 16,808 acres were planted to citrus with harvest valued around \$120 million; 11,391 acres were planted to grape, valued around \$125 million (Riverside County 2011). The county also has 138 registered organic farms (Riverside County 2011).

Tulare County

Tulare County covers an area of 4,863 square miles. Agricultural production dominates the fertile valley floor in the western half. The County is the second-leading producer of agricultural commodities in the United States (Tulare County 2011), reporting over 1.6 million acres of harvested cropland (equivalent to 2,570 square miles or 57 percent of the

county's land cover) in 2011 (Tulare County 2011). Of this, over 4,600 acres was dedicated to organic farming, with organic citrus grown on 1,897 acres and organic grapes grown on 915 acres (Tulare County 2011).

In 2011, citrus was grown on 119,086 acres; grapes on 61,060 acres (Tulare County 2011). The economic value for citrus was \$872 million; grapes was \$532 million.

B. Air Quality

The GWSS area-wide management program intersect five air quality basins. These include the Mojave Desert, South Central Coast, South Coast, San Joaquin Valley and Salton Sea Basins (CEPA 2011). These basins do not meet state air quality standards for several compounds, including ozone, particulate matter, nitrogen dioxide, and sulfur dioxide. Despite significant improvements, air quality remains a major source of public health concern in large metropolitan areas throughout the State. In particular, the San Joaquin Valley and the South Coast Air Basins continue to face significant challenges in meeting state and federal air quality standards for ozone and fine particulate matter. Among the contributors to poor air quality conditions within the region, mobile sources of emissions continue to increase along with population and vehicle miles traveled.

C. Water Quality

California is divided into 10 hydrologic regions, four of which occur within the five counties proposed for potential GWSS management activities (CDWR 2009). Details regarding each region within the survey area are summarized in other documents for the Colorado River, South Coast, South Lahontan and Tulare Lake Hydrologic Regions (CDFA 2009). The regions are delineated based upon the State's major drainage basins. Each region has distinct precipitation characteristics and water bodies that channel or retain runoff. Multiple surface water bodies within the current program area are listed as impaired under the Clean Water Act Section 303(d). Reasons for impairment vary widely with inorganic chemicals, such as heavy metals, to organic compounds, such as pesticides, being the causative agents. Nonchemical impairments, such as sedimentation have also been noted for some waterbodies (EPA 2006).

Ground water provides more than 40 percent of California's drinking water; however, the quantity and quality of this resource varies between hydrologic regions. Groundwater quality in the region is affected by withdrawal and recharge rates as well as agricultural, residential, and commercial/industrial practices. Impairments to ground water quality include inorganic and organic contamination within the four hydrologic regions within the proposed program area. Inorganic contamination with

total dissolved solids, nitrates, and some minerals are reported in the South Coast Hydrologic Region. Within the San Joaquin Valley Hydrologic Region, trace elements, including arsenic, lead, selenium and fluoride are found at varying concentrations in the primary aquifers (USGS 2012).

One or more watersheds in all of the counties except Tulare that would be part of the proposed GWSS area-wide management program have chlorpyrifos listed as an impairment. The other pesticides proposed for use in the GWSS area-wide management program were not specifically identified as impairments. Two watersheds list Group A pesticides as impairments; three watersheds listed “pesticides-not specified” as impairments (EPA 2006). The watersheds that cross the counties within the proposed GWSS area-wide management program area are shared with counties not part of the Program.

D. Ecological Resources

The proposed program area is in commercial citrus orchards collocated with grape vineyards in Fresno, Kern, Madera, Riverside and Tulare counties in California. The treatment areas are limited and pesticide application would only occur if trapping indicates a high enough population (i.e. five or more adult GWSS within a radius of 300 yards within a five-day period, or multiple life stages detected at a given time) of GWSS to warrant treatment. Orchards are intensively managed agricultural areas however various non-target species may utilize these areas. The counties covered in the GWSS area-wide management program contain state identified rare plants and animals as well as federally protected species.

The program area covers a portion of California’s Pacific Flyway, an annual migratory bird route for millions of birds. In the San Joaquin Valley, agricultural lands are often managed to conserve migratory birds through a series of National Wildlife Refuges, Joint Ventures, the Central Valley Joint Venture Conservation Program, California Riparian Bird Conservation Program, and other joint ventures administered by the U.S. Fish and Wildlife Service (FWS 2010b, a, Pacific Flyway Council 2013) in cooperation with numerous State, Federal, local and nongovernmental partners.

Habitat Conservation Planning Efforts

In an effort to minimize the impacts of ongoing demands on remaining wildlands within the State, the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), in cooperation with the California Department of Fish and Wildlife and voluntary applicants, are currently engaged in numerous efforts aimed at conserving Federal and State listed species on remaining open spaces within the State. To date,

these efforts are generally pursued through section 10 of the Federal Endangered Species Act (ESA) as amended and the California Endangered Species Act's Natural Community Conservation Planning Act processes, covering over 9 million acres within the State (CDFW 2013a).

Within the State, four other ongoing land conservation planning efforts are pursued through FWS' Partners for Fish and Wildlife Program. In addition, FWS Partners Program assists private landowners and other interested parties with habitat restoration in wetland and riparian areas, as well as managing and removing invasive species. To date, over 62,000 acres have been restored (FWS 2010b).

Western Riverside County MSHCP

The Western Riverside County Multiple Species Habitat Conservation Plan (WRMSHCP) was created to implement one of America's most ambitious environmental efforts. To date, the WRMSHCP is the largest and most complex of the regional HCP plans developed to set aside half a million acres of habitat in southern California and protect 146 native species of plants and animals. The premise behind this regional planning effort was to identify and conserve high quality habitats and the species that depend on them while integrating and providing for future land use, transportation and wildlife conservation to residents of western Riverside County. The WRMSHCP covers habitat and focal species, including riparian/vernal pool ecosystems, coastal sage scrub, uplands, vegetative communities, and numerous threatened or endangered plant and animal species (CDFW 2013b). Agricultural communities included within the WRMSHCP are field crops, groves, and orchards. As of 2012, the county has reached 77 percent of the goal in the WRMSHCP (CDFW 2013a).

Coachella Valley MSHCP

The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) aims to conserve over 240,000 acres of open space and protect 27 plant and animal species. By providing comprehensive compliance with federal and state endangered species laws, the CVMSHCP safeguards desert natural heritage for future generations by conserving natural communities and habitats. The CVMSHCP includes 27 species, including five plants, two insects, one fish, one amphibian, three reptiles, eleven birds and four mammals (CDFW 2013a).

Kern Water Bank HCP

The Kern Water Bank (KWB) occupies approximately 20,000 acres in the southern San Joaquin Valley. It is operated under a Habitat Conservation Plan/Natural Community Conservation Plan (HCP) which prescribes reporting and planning requirements, adaptive management methodologies, and avoidance and mitigation measures. The Kern Water Bank HCP was executed on October 2, 1997 by and among the FWS, the CDFG, and Kern

Water Bank Authority, a joint powers authority. The HCP designates 3,267 acres of the Kern Water Bank as a Conservation Bank to assist the mitigation efforts of construction and maintenance projects that may temporarily or permanently disturb endangered species habitat. The HCP's primary water conservation objective is the storage of water during times of surplus for recovery during times of shortage. The primary environmental objective is to set aside large areas of the KWB for threatened, endangered, and sensitive species and to implement a program to protect and enhance the habitat (KWBA 2013).

Bakersfield Regional Habitat Conservation Plan (Kern County)

This Natural Community Conservation Plan was initiated in 1994 and was reviewed in 2014 to last through 2019. The primary goal of this HCP is to protect native habitats that support threatened and endangered species while allowing project development to occur (CDFW 2013a).

Desert Renewable Conservation Plan (DRECP)(covers multiple counties including parts of Kern and Riverside County)

The desert regions of California provide extensive renewable energy resource potential. The goal of this plan is to protect and support the biological and natural resources, including threatened and endangered species while developing compatible renewable energy generation facilities and related transmission infrastructure to achieve renewable energy requirements and goals. The DRECP is intended to advance state and federal conservation goals in these desert regions while also facilitating the timely permitting of renewable energy projects under applicable State and federal laws (CDFW 2013a).

Salmon Recovery

There are 10 evolutionary significant units (ESUs) of Pacific salmon and steelhead listed by the National Marine Fisheries Service (NMFS) as either threatened or endangered in California. NMFS manages individual population segments within hydrological units to maximize recovery efforts; from 2000 through 2009, NMFS has invested over \$121 million in salmon recovery efforts in the State of California (NMFS 2010). The majority of these funds are spent restoring degraded habitat and opening passage to historically occupied watersheds that have been blocked by reclamation and agricultural water developments. Historically, salmon and steelhead were abundant in all of the coastal and major river systems within the State. The program area contains one ESU, the Southern California Steelhead (*Oncorhynchus mykiss*).

IV. Environmental Impacts

Because the principal environmental concerns in the proposed program relate to use of chemical pesticides, this assessment will focus on the potential environmental consequences of those pesticides on human health and the environment.

A. No Action

Under the no action alternative APHIS would conduct the program that is currently in place and described in the EA from 2015. The environmental impacts from the current program insecticides were previously evaluated in a chemical risk assessment (USDA 2002a) and environmental assessments (USDA 2002b, 2015). These documents are incorporated by reference for this supplemental EA.

B. Preferred Alternative

The GWSS area-wide management program includes all of the management options previously described as well as the addition of two new insecticides, flupyradifurone and cyantraniliprole. The preferred alternative encompasses cultural practices, chemical treatments, and biological control. APHIS' participation in the program is to provide funding for reimbursing commercial citrus growers for their application of pesticides approved for use in the Program. The Program does not require chemical treatments to treat for GWSS but provides a list of recommended insecticides, that if used allow for reimbursement to growers for the cost of treatment. Growers can choose the insecticide that best fits their pest management strategy. APHIS encourages integrated pest management practices, including cultural and biological control methods, to reduce the usage of pesticides.

The following sections discuss the toxicity, exposure, and potential impacts to human health and non-target species for each pesticide that was not previously evaluated. The environmental quality is also discussed for each insecticide.

Flupyradifurone

Flupyradifurone is a butenolide insecticide that targets sucking insect pests (Nauen et al. 2014). Butenolides are chemicals which act on insect nicotinic acetylcholine receptors (nAChRs), which are central to nervous transmission in insects (Nauen et al. 2014, Jeschke et al. 2015). Flupyradifurone is systemic in plants and has been developed for use on a wide range of crops using either a soil drench, foliar spray or seed treatment. Treatments in the GWSS program will be made as foliar sprays.

1. Human Health

Flupyradifurone has low acute toxicity to mammals based on oral, dermal and inhalation toxicity studies using the technical active ingredient and proposed formulation. The median oral lethality value was 2,000 mg/kg while median lethality values were greater than the highest test concentration in dermal and inhalation exposures (Bayer 2013). The technical ingredient is a slight eye irritant but does not irritate the skin (Category III and IV, respectively). Flupyradifurone is not considered to be genotoxic, carcinogenic immunotoxic or have any developmental or reproductive effects at relevant doses (EPA 2013b). An acute RfD of 0.35 mg/kg /day was established based on the results from the acute neurotoxicity study that reported a LOEL of 50 mg/kg/day (EPA 2015))Risk to workers is minimal due to the low toxicity of flupyradifurone and reduced exposure to applicators as a result of label requirements including personal protective equipment (PPE). Risks to the general population that would consume treated citrus from orchards that received applications of this insecticide would be low due to low toxicity of flupyradifurone and the timing of application relative to harvest. Due to the systemic nature of flupyradifurone, there is the possibility of residues in citrus harvested for human consumption. Conservative estimates of exposure to all population segments, and the low toxicity to mammals suggests low risk to all groups (EPA 2015).

2. Ecological and Environmental Quality

Flupyradifurone toxicity to wild mammals is low based on the available toxicity data for mammals used to support human safety. In dietary studies flupyradifurone is considered practically nontoxic to birds with median lethality values greater than the highest test concentration. In oral dosing studies flupyradifurone has moderate toxicity to birds with median lethality values ranging from 232 to 330 mg/kg (EPA 2013b). Flupyradifurone toxicity to honey bees is low based on contact exposures but is considered highly toxic to honey bees in oral exposures. Chronic feeding studies using larval and adult honey bees has shown low toxicity with no adverse effect concentrations exceeding 1000 µg ai/L (Bayer 2013). Field studies using honey bees have demonstrated a lack of adverse impacts, including colony health.

Flupyradifurone toxicity to aquatic vertebrates such as warm and cold water fish species and larval amphibians is low with median lethality concentrations exceeding 70 mg/L (EPA 2013b). Flupyradifurone toxicity to aquatic invertebrates is more variable with median lethality toxicity values ranging from 0.064 mg/L for the midge to greater than 77 mg/L for the freshwater cladoceran, *D. magna* (EPA 2013b). Chronic toxicity to aquatic invertebrates from flupyradifurone is comparable to acute data showing that the cladoceran is the least sensitive test species while others such as the midge and mysid shrimp are more sensitive in long term exposures. Toxicity to aquatic vascular plants and green algae is low with

effect concentrations exceeding the highest test concentration. Available data suggests that degradates of flupyradifurone have equal or less toxicity to aquatic organisms.

Flupyradifurone degradation in soil is variable based on the soil type and amount of organic matter. Aerobic soil metabolism half-lives range from approximately 75 to 711 days. Flupyradifurone does exhibit environmental fate properties that suggest it could move into surface and ground water. Flupyradifurone is considered soluble in water and does not bind tightly to soil based on the range of organic carbon partitioning coefficients (K_{oc}) that have been reported for the parent compound (80.74- 283). Label language with restrictions and recommendations regarding applications to certain soils and in proximity to aquatic habitats will reduce the potential for residues to move to ground or surface water. Flupyradifurone is not expected to volatilize from soil or water into the atmosphere based on available chemical property data (EPA 2013b).

Cyantraniliprole

Cyantraniliprole is an anthranilic diamide insecticide which selectively activates ryanodine receptors, leading to uncontrolled release of stored calcium ions in muscle cells, and, ultimately, death (Selby et al. 2013). Uptake in plant xylem provides protection to foliar surfaces and to roots against chewing and sucking pests such as aphids, thrips, and whiteflies (Foster et al. 2011).

1. Human Health

Cyantraniliprole acute toxicity to mammals is considered low with oral, dermal and inhalation values greater than the highest test concentration (EPA 2013a). The technical ingredient is a slight eye irritant but does not irritate the skin (Category III and IV, respectively). Cyantraniliprole is not carcinogenic, mutagenic or neurotoxic based on available studies (EPA 2013a). The risk to humans is greatest for workers however no adverse effects are expected for this group of the population due to the low toxicity of cyantraniliprole and label requirements designed to minimize exposure. Conservative estimates of exposure and risk to the general public, including children, show low risk based on aggregate exposure scenarios (EPA 2013a). Aggregate exposure included conservative estimates of residues from food and water to various populations subgroups.

2. Ecological and Environmental Quality

Cyantraniliprole toxicity to wild mammals and birds is considered low based on acute and chronic toxicity studies (EPA 2013c). Toxicity to mammals is summarized above. The oral and dietary median lethality values for various bird species such as the bobwhite quail, zebra finch or mallard, were typically higher than the highest test concentration when testing the technical active ingredient. Chronic toxicity to bird is also low with no observable effect concentrations of 1000 mg/kg, or the highest test

concentration tested. Honey bee data for cyantraniliprole shows that acute and oral median lethality values are greater than the highest test concentration however the highest test concentration used in those studies would be categorized as highly toxic to honey bees. Other studies that evaluated cyantraniliprole formulations and degradates show that certain formulations and degradates may pose a higher risk to honey bees (EPA 2013c). The potential risk to pollinators, such as the honey bee is reduced due to label restrictions specific to pollinators designed to reduce exposure.

Available cyantraniliprole toxicity data for fish suggest low toxicity to warm and cold water species. Median lethality values for three test species (bluegill, channel catfish and rainbow trout) reported toxicity values greater than the solubility of cyantraniliprole in water (EPA 2013c). Toxicity is more variable for cyantraniliprole and aquatic invertebrates with median effect or lethality values ranging from 20.4 to greater than 14,000 $\mu\text{g ai/L}$. Toxicity to aquatic invertebrates would be classified as ranging from highly toxic to practically nontoxic with the freshwater cladoceran, *D. magna*, being the most sensitive test species. Sediment dwelling invertebrates such as the chironomid are less sensitive to cyantraniliprole compared to the cladoceran with a reported median lethality value of 719 $\mu\text{g ai/L}$. Offsite drift and runoff from cyantraniliprole applications could result in risk to certain aquatic invertebrates. The risk to this group of organisms will be reduced by label restrictions regarding applications near surface water such as application buffer zones and the use of filter strips.

The dissipation half-lives of cyantraniliprole in soil are relatively short ranging from 3.5 to 44 days. Cyantraniliprole is susceptible to degradation from light and microbial activity. The soil photolysis half-life is 12 days and the aerobic soil metabolism half-lives range from 16.2 to 89.4 days (EPA 2013c). Cyantraniliprole is also susceptible to degradation from microbial activity in water with half-lives ranging from 3.9 to 25.1 days. Degradation in water in the presence of light is also short with a half-life of less than a half a day (EPA 2013c). Cyantraniliprole does exhibit environmental fate properties that suggest it could move into surface and ground water. Cyantraniliprole has moderate solubility in water and does not bind tightly to soil based on the range of organic carbon partitioning coefficients (K_{oc}) that have been reported for the parent compound (157-376) (EPA 2013c). Label language regarding applications to certain soils and in proximity to aquatic habitats will reduce the potential for residues to move to ground or surface water. Cyantraniliprole is not expected to volatilize into the atmosphere due to its solubility in water and low vapor pressure.

C. Cumulative Effects

Cumulative impacts are those impacts on the environment which result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impacts from the selection of the preferred alternative are considered incrementally negligible and would be less than those from the selection of the no action alternative.

A variety of crops grown in the five counties covered in the GWSS area-wide management program are treated to control other insect pests. Acetamiprid was used on 61 different crops; chlorpyrifos on 54 different crops; cyfluthrin on 43 different crops; imidacloprid on 95 different crops (including animal husbandry); methomyl on 43 different crops; and pyrethrins on 77 different crops (CDPR 2013). Cyantraniliprole and flupyradifurone data does not appear to be available for the five counties where the GWSS program operates. Since these are relatively new products there use would be expected to expand over time and may replace some of the currently used products to control GWSS and other pests. The proposed addition of the new insecticides discussed in this EA are expected to result in incrementally negligible cumulative impacts. Applications will be limited to commercial citrus orchards collocated with vineyards that currently receive chemical applications, including chemistries proposed in the GWSS program. Applications will only occur when GWSS detections exceed threshold levels, with program activities coordinated by APHIS, CDFA and county personnel. CDFA contracts treatment coordinators who advise growers when they are to make applications with the proposed list of insecticides that have been proven effective against GWSS. In addition the University of California's Integrated Pest Management Guidelines describe management options for pest and diseases in California's citrus crop (University of California 2012). The IPM guidelines describe application rates and usage restrictions to protect pollinators and the surrounding environment.

D. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure 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. CDFA works with the FWS regarding the presence of listed species in areas where program activities may occur. In cases where CDFA and the FWS/NMFS determines that there is a potential for exposure of listed species to

program activities a biological assessment will be prepared to ensure their protection. Mitigation measures for any of the proposed insecticides that are part of ESA-related litigation, or are part of a biological opinion, within the proposed action area will be implemented where appropriate.

E. Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 United States Code (U.S.C.) 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 (MOU) with the FWS which promotes the conservation of migratory bird populations. On August 2, 2012, an MOU between APHIS and the FWS was signed to facilitate the implementation of this Executive order.

Proposed insecticide applications will occur in citrus groves where birds may nest and forage. Orchards are disturbed areas that are actively managed for agricultural production. The proposed insecticides vary in their toxicity to birds; however, most have low toxicity and would not be expected to result in direct risk beyond other chemical applications that would occur in these areas. The proposed two new insecticides would be expected to have no direct effects to birds based on their low acute and chronic avian toxicity. There would be some loss of invertebrate prey items for birds that forage in citrus orchards and the impacts will depend on the specific chemical used in the GWSS program. Cyantraniliprole and flupyradifurone are more selective to certain invertebrate groups compared to some of the other insecticides proposed for use in the GWSS program. The loss of prey items for insectivorous birds will be localized to treated areas within the orchard that may receive a chemical treatment. Birds would typically have a foraging range larger than the areas treated in an orchard and would have access to invertebrates within the orchard that aren't sensitive to chemical treatment.

F. 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 and 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. The human health and environmental effects from the proposed applications are expected to be minimal and are not expected to have disproportionate adverse effects to any minority or low-income family. The use pattern and available data regarding risk for each of the proposed insecticides, including the two new insecticides proposed for the GWSS program, suggests that minority and low income populations will not be at a disproportionate risk.

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. Use patterns for chemical use in the GWSS area-wide management program and available chemical risk assessment data suggests that children will not be at risk from GWSS program activities, including the use of cyantilanilprole and flupyradifurone.

Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments” was issued to ensure that there would be “meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications....” The location of commercial citrus groves in or near to tribal lands was considered in terms of the potential treatment of such citrus under the GWSS program. A request for consultation with tribes that occur in the five counties that are covered in the initial EA was submitted to each tribe.

NEPA requires compliance with laws and regulations that fulfill the purpose of preservation and protection of important historic and cultural resources, such as the National Historic Preservation Act (NHPA, 16

U.S.C. 470 et seq.) and the Archeological Resources Protection Act (ARPA, 16 U.S.C. 470aa-mm). The GWSS program will involve the deployment of detection traps and the recommendation of pesticides that can be applied by commercial citrus growers.

The proposed action for the GWSS program involves targeted chemical applications and other program activities that are designed to prevent adverse effects to historic and archeological properties and therefore are not expected to affect any district, site, building, structure or object that is included in or eligible for inclusion in the National Register of Historic sites under the National Historic Preservation Act, or the Archeological Resources Protection Act.

No designated historic or archeological sites have been identified within or nearby the current program boundaries and no adverse effects to such sites are anticipated as a result of program pesticide applications. Should the program area expand to culturally-sensitive areas, APHIS will contact the California Office of Historic Preservation to determine if the proposed action will have a negative impact on historic properties.

V. Listing of Agencies and Persons Consulted

Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
650 Capitol Mall, Suite 6-400
Sacramento, CA 95814

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
Riverdale, MD 20737

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Appendix A. Glassy-winged sharpshooter distribution in California

