

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

**Action Plan for Asian Citrus Psyllid and Huanglongbing
(Citrus Greening) in California**

September 2019

This document states CDFA’s statewide Action Plan for ACP and HLB in California and details the program implemented by CDFA to sustain and protect California’s commercial citrus production.

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I. Action Statement

The California Department of Food and Agriculture (CDFA) will act to sustain and protect commercial production of citrus in the state of California through the implementation of this Action Plan for Asian citrus psyllid (ACP) and Huanglongbing (HLB).

Program elements will include:

- An ACP eradication program in areas where eradication is deemed feasible;
- An ACP suppression program using pesticide applications in areas where suppression is deemed feasible;
- An ACP population reduction program using biocontrol agents to slow ACP expansion from heavily infested areas;
- An HLB eradication program;
- A statewide early detection program for both ACP and HLB;
- An ACP and HLB regulatory program;
- An on-going dialog with scientists from the ACP/HLB Ad Hoc Science Advisory Panel, University of California (UC), state and federal agencies, members of the citrus industry, and regulatory officials to ensure program design and elements consider the best available science and promote and protect the citrus industry;
- A grower education, outreach, and coordination program;
- A public education and outreach program.

As recommended in the Area-Wide Control (AWC) of ACP Technical Working Group (TWG) Report (final report, February 9, 2009), implementing an effective ACP-suppression program will “sustain commercial production of citrus and allow time for research to provide more effective, long-term solutions.” CDFA’s goal is to sustain and protect commercial citrus production while efforts are underway to find long-term solutions for sustaining citrus production. The value of California citrus production in the 2016-17 marketing year was \$3.389 billion. The total economic impact of the industry on California’s economy in 2016-17 was \$7.1 billion. The California citrus industry added \$1.695 billion to California’s state GDP in 2016 and estimated full time equivalent jobs in the California citrus industry in 2016-2107 totaled 21,674. Estimated wages paid by the California citrus industry income in 2016-17 totaled \$452 million. A 20% reduction in California citrus acreage would cause a loss of 7,350 jobs, \$127 million in employee income, and reduce state GDP by \$501 million.

ACP, one of only two confirmed vectors of the deadly citrus disease, HLB or greening disease, was first detected in California in 2008. As a result, CDFA

implemented delimitation and survey techniques to determine the extent of the infestation, and enacted state interior quarantine restrictions to contain the psyllid and protect areas where the psyllid was not yet known to occur.

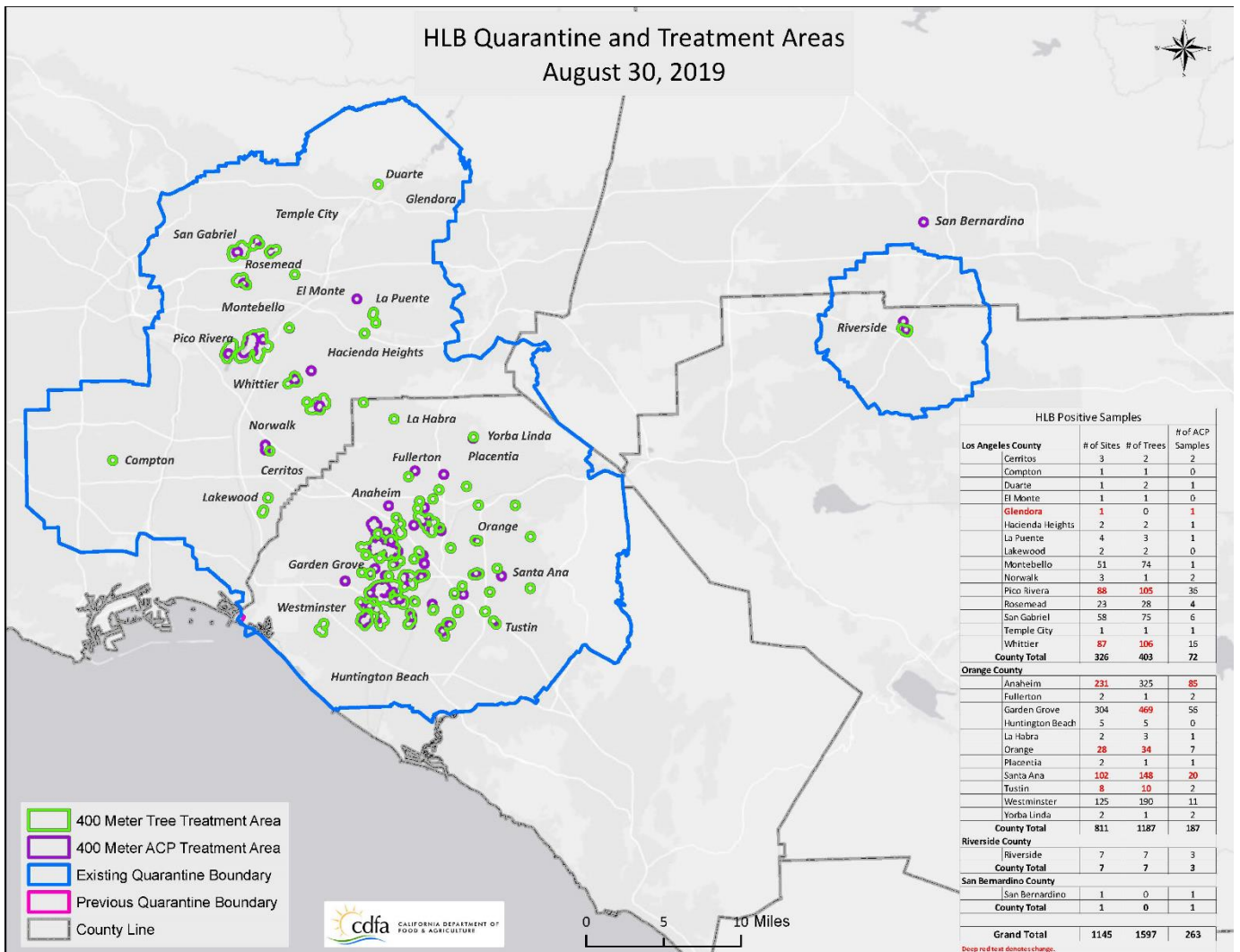
Quarterly Review

CDFA will review this plan on a quarterly basis to ensure all actions are consistent with identified program goals and objectives and will consider adjustments as necessary as a result of new and relevant information, technologies, pest pressures, or other developments. Current scientific findings and recommendations, as well as updated federal and state regulations, policies, and/or industry practices will be reviewed to ensure CDFA's actions are coordinated, scientifically-based, transparent, and consistent with the goal of protecting California's commercial citrus production.

II. Current Status of ACP and HLB

The counties of San Diego, Imperial, Riverside, San Bernardino, Orange, Los Angeles, Santa Barbara, and Ventura are generally infested with ACP. The counties of Fresno, Kings, Kern, Madera, San Joaquin, Stanislaus, San Benito, San Mateo, Monterey, Merced, Sacramento, San Francisco, Santa Clara, Alameda, Yolo, Placer, Contra Costa, Solano, San Luis Obispo, and Tulare are partially infested.

Host plants, including citrus trees have been infected with HLB and or ACP have been found to be positive for bacteria that causes HLB, *Candidatus Liberibacter asiaticus* (CLAs) in Los Angeles, Orange, San Bernardino, and Riverside Counties.



III. Pest Profiles

Asian Citrus Psyllid (ACP)

The ACP, *Diaphorina citri* is a small, plant-feeding insect. It is 3 to 4 mm in length, smaller than a grain of rice, and difficult to detect due to size and sedentary nature when undisturbed. ACP adults are mottled brown in color and are typically found feeding on new flush and the underside of older leaves. When feeding, the adult's body is angled 30-45 degrees off the plant. Adults will jump or fly when disturbed but disperse only relatively short distances from the host plant.

ACP nymphs and adults have piercing-sucking mouthparts which enable them to pierce the new growth of citrus and feed on the vascular system (phloem.) ACP attacks all varieties of citrus and very closely related ornamental plants in the family Rutaceae. Preferred host plants include citrus (all varieties), orange jasmine, and curry leaf. As they feed, ACP produce a toxin that causes the plant tips to die back and become contorted, preventing the leaves from expanding normally. Eggs of ACP are almond-shaped, about 0.3 mm in length, and start out pale yellow and turn orange as they mature. Egg development lasts three to nine days depending on temperature. ACP nymphs are sessile and feed exclusively on new growth. Nymphs go through 5 instars and range in size from 0.3 mm long in the first instar to 1.6 mm long as fifth instars. Nymphs are yellow with red eyes and produce white, tubular, waxy secretions which can be visible from a distance and used as a visual detection aid. The presence of the waxy secretions can encourage the growth of sooty mold.

Huanglongbing (HLB) or Citrus Greening (CG)

Prior to 2004, HLB, also known as CG, was known to occur in Asia from Japan to southern China, in Southeast Asia, and the Indian subcontinent to Pakistan. It also exists in the Arabian Peninsula, and in Africa. It was first reported in the Western Hemisphere in Brazil in 2004, and then it was first confirmed in the United States in Florida in 2005. It now occurs throughout Florida, Georgia, Puerto Rico, and the U.S. Virgin Islands. It has been confirmed in portions of Louisiana, South Carolina, and Texas, and it has been found in residential trees in California (Hacienda Heights, San Gabriel and Cerritos, Los Angeles County and La Habra, Fullerton and Anaheim, Orange County). HLB infects all commercial citrus species. A distinctive characteristic of infected trees is the development of one or more yellow shoots, while other parts of the tree remain asymptomatic. A diseased tree takes on a sectored appearance. Individual leaves often have an asymmetrical "blotchy mottle" appearance.

HLB is caused by bacteria CLAs which can be transferred to plants in the citrus family (Rutaceae) by an infected ACP (adult or nymph). HLB-infected trees bear

small, asymmetrical fruit which are partially green, bitter, and unsalable. The disease destroys the appearance and economic value of the trees and will eventually cause the death of the tree.

During feeding, ACP adults and nymphs can become infected with CLAs (the bacteria that causes HLB). Once infected, ACP can efficiently transmit CLAs through feeding to the host plant.

Transmission can also occur through grafting of infected plant tissue. The bacterium enters the phloem of the plant and blocks transportation of nutrients within the tree.

Infected trees may have areas with mottled yellow leaves (generally asymmetrical patterns are seen) and will produce irregular shaped, hard, bitter-tasting fruit. Infected trees die within three to five years. HLB is considered to be one of the most serious plant diseases in the world and currently there is no cure.

IV. Organization, Responsibilities, and Staffing

The Incident Command System (ICS)

Managing ACP and HLB in California is a coordinated, interagency effort between the United States Department of Agriculture (USDA)/Animal and Plant Health Inspection Services (APHIS), CDFA, and the County Agricultural Commissioners (CACs), and requires the participation of multiple non-governmental entities (industry members, university researchers, technical specialists, etc.)

The presence of ACP and HLB in California constitutes an “incident” as per the Federal Emergency Management Agency (FEMA), and represents a threat to the environment and property. Responding to these pests is required to ensure protection of valuable resources. Because federal funding has been requested to implement the response, the Incident Command System of management is used.

The ICS is an action planning process which ensures that all ACP and HLB-related activities are coordinated and communicated with all partners involved, and that all activities are in support of identified objectives. The ICS process ensures integration of all program elements, from planning, operations, communication, and outreach, to equipment needs and financial management. Using the ICS process allows for a standardized system of communication, collaborative decision-making and cost-effective resource utilization.

Representatives from CDFA, USDA, and affected CACs convene regularly (daily, weekly, or other frequency as determined necessary) to plan, communicate, and act on the ACP and HLB response in California.

United States Department of Agriculture (USDA)

The USDA, APHIS Plant Protection and Quarantine (PPQ) is responsible for administration of the Citrus Health Response Program (CHRP). The goal of CHRP is to sustain the United States’ citrus industry, to maintain grower’s continued access to export markets, and to safeguard the other citrus growing states against a variety of citrus diseases and pests, including ACP and HLB. The CHRP provides guidelines for nursery stock production, fruit inspection, treatment, and certification.

The PPQ, Center for Plant Health Science and Technology (CPHST) provides scientific support for PPQ regulatory decisions and operations. CPHST is responsible for ensuring that PPQ has the information, tools and technology to make the most scientifically valid regulatory and policy decisions possible. In addition, CPHST ensures PPQ’s operations have the most scientifically viable and practical tools for pest exclusion, detection, and management.

The National Plant Protection Laboratory Accreditation Program (NPPLAP) evaluates laboratories that use molecular diagnostics for APHIS-PPQ to ensure their capability to make accurate diagnostic determinations for regulatory purposes.

The USDA Agricultural Research Service (ARS) is the chief scientific in-house research agency for the USDA. ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to ensure high-quality, safe food, and other agricultural products. ARS also works to assess the nutritional needs of Americans, sustain a competitive agricultural economy, enhance the natural resource base and the environment, and provide economic opportunities for rural citizens, communities, and society as a whole.

The Department of Homeland Security, Customs and Border Protection (CBP) employs agriculture specialists at U.S. ports of entry and international mail facilities to target, detect, intercept, and thereby prevent the entry of invasive pest and disease threats before they have a chance to do any harm. The CBP agriculture specialists work with specialized x-ray machines that detect organic materials. They utilize agricultural canines specifically trained to sniff out meat and plant material at international ports of entry.

California Department of Food and Agriculture (CDFA)

The CDFA Citrus Pest and Disease Prevention Division (CPDPD) in collaboration with the Plant Health and Pest Prevention Services (PHPPS) develops, administers, manages, and implements the Citrus Pest and Disease Prevention Program (CPDPP). Program elements include:

- Administration of Federal Agreement
- Urban and Rural Residential Detection Trapping and Visual Survey
- Citrus Grove Trapping and Survey
- Delimitation Trapping and Visual Survey
- Treatment Activities
- Regulatory Quarantine Restrictions
- Public Outreach and Messaging

Within CDFA, three Branches provide different services in support of the ACP and HLB Action Plan:

- Pest Detection and Emergency Projects (PDEP) Branch conducts all aspects of ACP and HLB survey, detection, and treatment activities.
- Pest Exclusion (PE) Branch conducts all aspects of implementation of State Interior Quarantine regulations for ACP and HLB.

- Plant Pest Diagnostics Center (PPDC) conducts diagnostics pertaining to HLB and ACP.

Citrus Pest and Disease Prevention Committee (CPDPC)

Food and Agricultural Code Section 5914 creates the California Citrus Pest and Disease Prevention Committee (CPDPC). The CPDPC, comprised of Secretary-appointed members of the California citrus industry and general public, is authorized to develop, subject to Secretary approval, a statewide citrus specific pest and disease work plan that includes, but is not limited to, the following:

1. Informational programs to educate and train residential owners of citrus fruit, local communities, groups, and individuals on the prevention of pests and diseases and their vectors, specific to citrus.
2. Programs for surveying, detecting, analyzing, and treating pests and diseases specific to citrus involving producers of citrus and residential owners of citrus fruit and host materials, except as provided in FAC Section 5930.

In addition, the CPDPC submits recommendations to the Secretary on, but not limited to, the following:

- Annual assessment rate.
- Annual budget.
- Expenditures necessary to implement the statewide work plan developed pursuant to this section.
- The amount of fees to be levied, as provided in Section 5919.
- The receipt of money from other sources to pay any obligation of the committee and to accomplish the purposes of the committee in the manner provided in this article.
- The adoption of regulations consistent with the powers and duties of the committee.

Strategic Plan

To evaluate and improve its strategies for fighting the progression of HLB in California while providing a roadmap for the future, the CPDPC recently developed a strategic plan with five key priorities to guide its focus.

The plan identified five prioritized strategies to achieve CPDPC's goals of keeping HLB out of commercial groves, limiting ACP movement and fine-tuning the program. In addition, the CPDPP agreed to align its annual budget in support the priorities below. The program and its subcommittees will work together to execute the following:

1. Quickly detect and eradicate diseased trees by improving the urban survey and sampling processes, continuing quick mandatory tree removal of infected trees, and collaborating with the scientific community on early detection efforts.
2. Control movement of psyllids around the state and enforce regulations by increasing enforcement staff with emphasis in HLB quarantine areas and implementing a regional ACP quarantine with performance standards.
3. Suppress psyllid populations by promoting grower participation in area-wide treatment programs, removing uncared for host plants, continuing to use biocontrol and continually assessing urban treatment protocols.
4. Improve data technology, analysis and sharing and explore new solutions for digitization of data, including Pesticide Usage Reports.
5. Use outreach and collaboration to encourage homeowner and industry participation in program efforts and foster local governments' support for program activities.

Statewide Grower Liaison Coordinator and Grower Liaisons

A Statewide Grower Liaison Coordinator and Grower Liaisons will be employed, to provide services to growers.

The Statewide Grower Liaison Coordinator shall be employed to act as the lead over the Grower Liaisons, providing assistance, coordinating meetings and outreach materials on area-wide and program treatment activities and to provide support as needed.

Grower Liaisons shall provide the function of disseminating outreach and education materials to the citrus growers in their assigned area to facilitate coordinated area-wide treatments. Grower Liaison will be assigned to work in the following counties: Fresno, Tulare, Kern, Imperial, Riverside, San Bernardino, Santa Barbara/San Luis Obispo, San Diego and Ventura.

Grower Liaison tasks include:

- Contact and provide ACP/HLB and other program related information to individual growers, pest control advisors, packing houses, and others that work with the citrus industry.
- Facilitate treatment coordination as needed.
- Develop a local response plan in collaboration with the CPDPC.
- Coordinate seminars and speaking engagements.
- Assist with continuing to develop the citrus mapping layer in respective area.
- Document work and submit monthly report to Statewide Grower Liaison Coordinator.

- Attend monthly Outreach and Operations Subcommittee meetings and CPDPC meetings in person or via webinar as feasible.
- Attend grower meetings. This includes, but is not limited to, industry-related events for organizations such as California Association of Pest Control Advisors, Pesticide Applicators Professional Association, and the University of California, Cooperative Extension.

Statewide Grower Liaison Coordinator tasks include:

- Regular communication with Grower Liaisons to ensure specific tasks identified are adequately carried out.
- Regular communication with the Director of the CPDPD or her/his designee and the CPDPC.
- Stay current with the latest ACP research and pesticide treatment information.
- Facilitate communication between citrus growers and project staff.
- Evaluate effectiveness of the grower outreach and education program.
- Participate in citrus industry-related and various grower education programs.
- Attend monthly Outreach and Operations Subcommittee meetings and CPDPC meetings in person or via webinar as feasible.

All activities of the Statewide Grower Liaison Coordinator and Grower Liaisons are conducted in coordination with the CDFA CPDPD Director. CDFA provides general and technical oversight for all tasks assigned to the Statewide Grower Liaison Coordinator and to Grower Liaisons.

California County Agricultural Commissioner (CAC)

The CACs implement federal, state and local regulatory programs designed to promote agriculture and protect people, the environment and marketplace equity. The CACs provide regulatory services that are coordinated with the USDA/APHIS, CDFA, and the California Department of Pesticide Regulation (CDPR). Each CAC is licensed by CDFA and appointed by the respective county's Board of Supervisors.

The CACs conduct the following services related to the Action Plan for ACP and HLB:

• Pesticide Use Enforcement

Activities include the enforcement of State regulations pertaining to the safe use of pesticides; issuance of restricted material permits; on-sight inspection of

applications; administration of pesticide use reporting; surveillance of dealers, pest control advisors, and pest control operators; and investigate pesticide incidents. CACs enforce regulations to protect ground and surface water from pesticide contamination.

- **Pest Detection and Abandoned Grove Abatement**

In cooperation with CDFA and USDA/APHIS, the CACs conduct ACP trapping and survey programs. Program activities include placing and monitoring traps, screening traps for ACP, and submitting traps to approved regional screening locations, submitting traps with suspect ACP to the CDFA PPDC Entomology Laboratory, conducting visual surveys for HLB, and collecting and submitting tissue samples with suspect HLB symptoms.

Abandoned groves may serve as a harborage for ACP and a source of HLB inoculum, as they are not actively managed for the pest or disease. The CACs have the authority to abate abandoned groves in their counties. The CACs have general abatement authority under the Food and Agriculture Code (FAC) Section 5401-5405. These sections state that any premises, plants, conveyances or things which are infected or infested with any pest, or premises where any pest is found, are a public nuisance. It further states that the Commissioner can abate the property as a public nuisance at the expense of the property owner.

- **Pest Eradication**

In cooperation with CDFA and USDA/APHIS, the CACs facilitate CDFA and grower applied treatments for ACP by informing the County Boards of Supervisors, developing press releases, facilitating public meetings, and providing treatment and regulatory information for growers on their websites.

CACs work with CDFA Pest Detection and Emergency Projects Branch staff to conduct pre-treatment inspections and post-treatment monitoring for residual pesticides in surface waters at sites treated by CDFA.

- **Pest Exclusion/Quarantine/Phytosanitary Certification**

In conjunction with CDFA and USDA/APHIS, the CACs enforce State Interior Quarantine for ACP and HLB [California Code of Regulations Sections (CCR) 3434 and 3439], including, as applicable, the inspection of shipments from areas affected by the quarantine to ensure compliance, and enforce the terms of the various Master Permits issued by CDFA to enable movement of products from the affected areas otherwise prohibited by the quarantines.

CACs provide information and technical resources to citrus producers on pesticide use restrictions and facilitate communication with and information from

University of California (UC) Cooperative Extension on ACP management strategies, including an area-wide control program. CACs are responsible for oversight of licensed Pest Control Operators, including ensuring the safe and proper reporting of pesticides.

CACs provide training and technical resources to citrus production nurseries statewide regarding the implementation of the federally-approved insect resistant screen house program, and issue compliance agreements and conduct on-going inspections, sampling, and monitoring of approved, insect-resistant growing structures.

CACs provide phytosanitary certification services, including inspection, sampling, and issuance of compliance agreements and/or certificates to facilitate movement of regulated commodities from the affected ACP quarantine area. Phytosanitary certification is provided to meet state, federal, and international plant quarantine regulations pertaining to ACP.

V. Technical Advisors and Support

Technical Working Group (TWG)

TWGs are established as needed to provide scientific input on management of invasive species. A TWG was convened in December 2008 to address components of an area-wide control (AWC) program for the ACP in the United States. Outcomes, recommendations and research gaps were identified and published in February of 2009 in a report entitled “Area Wide Control of Asian Citrus Psyllid (*Diaphorina citri*) Technical Working Group Report”.

In September 2010, a second TWG was organized to assess the status of existing area-wide control efforts of ACP that resulted from the December 2008 meeting. The TWG addressed questions broadly covering insecticide applications, production practices, survey practices, and management areas. In general, the TWG summarized that area-wide ACP control is achieved with effective communication and coordination of treatments among local citrus growers and grove managers. ACP can be successfully controlled with coordinated treatments because the insect population will have fewer individuals left from which to reestablish.

Specific recommendations included:

- Treat as much citrus acreage as possible during each spray cycle to maximize coverage and prevent the establishment of pest refuge areas.
- Coordinated area-wide treatment applications should be completed within a two to three-week time frame.
- Mode of Action used should be coordinated and rotated within management areas to prevent development of insect resistance.
- Dormant season applications are most critical overall in maintaining ACP population reductions.
- Application methods (aerial, ground) should be tailored to fit each management area by considering geographical or environmental influences as well as unique location characteristics such as residential, organic production, or critical habitat interfaces.
- Management areas should be as large as possible, taking advantage of any natural geographic separations and existing cooperative efforts among producers. Management practices which promote flushing should ideally be coordinated within a management unit.
- Scouting emphasis for ACP detection should be placed on grove block perimeters. Scouting method(s) (sticky trap, visual, and stem tap) should be tailored to the specific area and circumstance.

- Organic growers within a management area should utilize the most efficacious product available during the coordinated treatment window.
- Extension, outreach and communication groups should be engaged to assist with education, communication, and public awareness in citrus growing states.

Center for Plant Health Science and Technology (CPHST)

Scientists with the USDA/CPHST are consulted on all program elements, including detection techniques, diagnostic tools, and exclusion policies. Scientists with CPHST are typically included in the TWG. CPHST worked with state and local cooperators to develop an area-wide management approach to controlling ACP which has been adopted by citrus growers in Texas. CPHST also develops and validates new molecular diagnostic tools and provides diagnostician training.

Agricultural Research Services (ARS)

Scientists with the USDA/ARS conduct research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to the CDFA. Scientists with ARS are typically included in the TWG. ARS Scientists are actively engaged in the development of survey programs being implemented in California. They are also engaged in research on early detecting technologies.

University of California, Division of Agriculture and Natural Resources (UC ANR), Cooperative Extension

The UC ANR provides scientific resources, including local UC ANR advisors, specialists, and research to the agricultural community. Specialists with UC ANR have provided science-based recommendations to growers for management of ACP in both generally infested areas and areas of new or expanding infestations. Specialists with UC ANR have developed a year-round ACP integrated pest management program, which addresses grower's concerns related to pesticide use, insect resistance, application timing, and ACP monitoring.

Specialists with UC ANR participate in ACP TWG meetings and are regularly consulted on issues relating to ACP quarantine enforcement policies, eradication, and control strategies deployed by CDFA.

The UC ANR also conducts research on HLB at the Biosafety level 3 facility at UC Davis and at the Biosafety level 3 facility at UC Riverside. Biosafety level 3 facilities are required for research and diagnostic work involving dangerous plant and animal pathogens.

Citrus Clonal Protection Program (CCPP)

The CCPP is a cooperative program with the UC, Riverside -Department of Plant Pathology and Microbiology, CDFA, USDA/APHIS, the citrus industry of the state of California and the Citrus Research Board (CRB). Since 2009, the CCPP has been a part of the National Clean Plant Network for specialty crops. The CCPP provides a safe mechanism for the introduction into California of citrus varieties from any citrus-growing area of the world for research, variety improvement, or for use by the commercial industry of the state. This mechanism includes, disease diagnosis and pathogen elimination followed by maintenance and distribution of true-to-type, primary citrus propagative material of the important fruit and rootstock varieties. The CCPP provides support to the citrus industry and CDFA by ensuring, through quarantine and disease testing, that citrus material entering California regardless of its point of origin, foreign or domestic is free from bud transmissible diseases.

ACP/HLB Ad Hoc Science Advisory Panel (SAP)

This SAP is made up of scientists from the UC and within the citrus industry and is advised by scientists from the USDA. These scientists are tasked with answering scientific questions so that policy makers may consider the best available science when developing eradication and control procedures and regulatory policies. This SAP has provided recommendations on the criteria that should be used to determine if an ACP population exists in an area, and when an area can be declared free of ACP. Full reports of the panel's recommendations are available online at: <http://www.cdfa.ca.gov/citruscommittee/docs/reports/SAP-Report-and-Meeting-031814.pdf>.

CDFA Primary Scientists (State Primary Entomologist, State Primary Plant Pathologist)

CDFA Primary Scientists provide scientific input to CDFA Executive staff and Branch managers to ensure science-based policy development and decision-making. Primary scientists develop and review protocols for all aspects of invasive pest programs, including detection, treatment, and quarantines.

Office of Environmental Health Hazard Assessment (OEHHA)

OEHHA protects and enhances public health and the environment through scientific evaluation of risks posed by hazardous substances. OEHHA and CDFA work collaboratively to develop and provide health information to the public on pesticide applications aimed at combating invasive species. A representative of OEHHA is present at CDFA public meetings which are scheduled prior to CDFA pesticide applications and will answer health related questions.

State Water Resources Control Board (SWRCB)

SWRCB issues National Pollutant Discharge Elimination System (NPDES) permits. CDFA has full coverage under a NPDES General Permit issued by the State Water Resources Control Board titled "Statewide General National Pollution Discharge Elimination System Permit for Biological and Residual Pesticide Discharges to the Waters of the United States from Spray Applications. The U.S. Environmental Protection Agency (EPA) and the SWRCB have classified this discharge as a minor discharge. The NPDES permit ensures CDFA is in compliance with the federal Clean Water Act (CWA) (33 U.S.C. §1251 et seq. (1972). The CWA is the body of law that establishes a framework for regulating pollutants discharged into navigable waterways of the United States. The CWA prohibits the discharge of any pollutant, including residual pesticides, into surface waters, except under the terms of a NPDES permit.

California Department of Pesticide Regulation (CDPR)

CDPR has primary responsibility to enforce pesticide laws and regulations in California. The Enforcement Branch oversees compliance with pesticide use requirements, has overall responsibility for pesticide incident investigations, administers a monitoring program for analyzing domestic and imported produce for pesticide residues, and ensures compliance with pesticide product registration and labeling requirements. CDPR works closely with CACs who are the primary local enforcement agents for pesticide laws and regulations. CDPR staff is present at CDFA public meetings and available to engage with interested homeowners.

United States Fish and Wildlife Service (USFWS)

The USFWS mission is, working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The USFWS helps protect a healthy environment for people, fish and wildlife, and helps Americans conserve and enjoy the outdoors and our living treasures. The Service's major responsibilities are for migratory birds, endangered species, certain marine mammals, and freshwater and anadromous fish. The USFWS provides technical assistance to CDFA on issues pertaining to the impact of program activities on federally listed threatened and endangered species and critical habitat.

National Marine Fisheries Service (NMFS)

The NMFS is the federal agency, a division of the Department of Commerce, responsible for the stewardship of the nation's living marine resources and their habitat and is responsible for the management, conservation and protection of living marine resources within the United States' Exclusive Economic Zone (water three to 200 mile offshore). NMFS assesses and predicts the status of fish stocks,

ensures compliance with fisheries regulations and works to reduce wasteful fishing practices. NMFS works to promote sustainable fisheries and to prevent lost economic potential associated with overfishing, declining species and degraded habitats. The NMFS provides technical assistance to CDFA on issues pertaining to the impact of program activities on threatened and endangered marine species and critical habitat.

California Department of Fish and Wildlife (CDFW)

The CDFW maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The CDFW provides technical assistance to CDFA on issues pertaining to the impact of program activities on State listed threatened and endangered species and critical habitat.

Industry Representatives

Industry representative are knowledgeable about existing production practices, including chemical and cultural insect control practices, harvesting and handling practices. Industry representatives provide information used in the development of regulatory and eradication policies and procedures and are queried for their input on the practicality and feasibility of proposed policies and procedures.

Citrus Research Board (CRB)

The CRB is a grower-funded and grower-directed program established under the California Marketing Act as the mechanism enabling the state's citrus producers to sponsor and support needed research. The priorities for the Citrus Research Program have been realigned to meet the challenges facing citrus growers in California. The objective of the program is to be reactive to immediate threats and planning for future threats to the economic production of citrus. The CRB partners with the CDFA on several projects, including biocontrol activities and research projects on early detection technologies. In addition, they provide support under a cooperative agreement for mapping the statewide citrus layer and providing HLB diagnostic analysis of ACP samples.

California Citrus Quality Council (CCQC)

CCQC's primary objective is to ensure that California citrus production meets domestic and international regulatory standards. CCQC works with government agencies, international standards setting organizations, the UC, the California citrus industry and trading partners to help the California industry meet domestic and international phytosanitary, food safety, food additive and pesticide residue regulations. The CCQC provides CDFA with input and updates on trade impacts associated with ACP and HLB.

Trade Associations

California Citrus Mutual (CCM) and Sunkist are both trade associations that work with citrus growers to market fruit nationally and internationally. CCM represents its members on matters that affect their economic livelihood and provide them with necessary information to enhance their ability to profit from their work. CCM closely monitors and becomes involved, as needed, in the regulatory and legislative process which may result in an economic impact to growers. Sunkist is a grower cooperative that works together to develop a worldwide market, promote a brand name, access a global transportation system, develop comprehensive research capabilities, and gain governmental access to overseas markets. Like other citrus trade associations, CCM and Sunkist partner with CDFR to ensure that grower's needs are being met by the program.

Nursery Industry Groups

The nursery industry has several industry groups that engage in activities to support the citrus nursery industry in California, including California Association of Nurseries and Garden Centers (CANGC), California Citrus Nursery Society (CCNS), the California Citrus Nursery Board (CCNB), and the California Nursery Advisory Board (NAB). CANGC is a trade organization, focusing on retail nurseries and garden centers, which works to promote and protect the California nursery industry. CCNS is a non-profit industry association helping the citrus nursery industry of California become more successful. CCNS provides an exchange for information useful to the citrus nursery industry. It holds an Annual Conference and several single-purpose meetings each year to disseminate information and/or to serve as forums for industry representatives to develop positions on matters of interest to the industry. CCNB, also known as the California Citrus Nursery Research and Education Program, is an industry-funded and directed program established under the California Marketing Act to enable the State's citrus nurseries to sponsor and support needed research. The NAB is a group appointed by the Secretary to advise CDFR on matters affecting and pertaining to nurseries in California. The NAB contains representatives from a wide spectrum of the nursery industry. The mission of the NAB is to grow and maintain a strong relationship between CDFR and the nursery industry in order to secure the industry's future. All these entities work collaboratively with the CDFR to ensure that the citrus nursery industry needs are represented and are being met by the program.

VI. Administrative Activities

Summary Abatement Action for Public Nuisances

Eradicating HLB involves tree removal. Typically, any action which involves the taking or destroying of property requires CDFA to follow standard, due process procedures including sending written notification, scheduling hearings, and providing the opportunity for the owner of the property to appeal the proposed action. Existing law, FAC Section 5762, establishes that any pest for which an eradication area has been proclaimed, and any stages of the pest, its hosts and carriers, and any premise, plants and things infested or infected or exposed to infestation or infection with such pest of its hosts or carriers, within such area, are public nuisances, which are subject to all laws and remedies which relate to the prevention and abatement of public nuisances. FAC Section 5763 establishes that the Department can take summary abatement actions against “public nuisances” when it is part of an eradication regulation.

FAC Sections 5762-5763 and California Code of regulation (CCR) 3439 enable the Department to take immediate, eradicated action against HLB in any area of the state where it may be found.

Public Notification

The public is notified prior to the CDFA engaging in program activities in their area. This can be done by a Proclamation of an Emergency Project (PEP) which informs readers that residents are in an emergency response area, or by issuing a Notice of Treatment (NOT) in new treatment areas. Some areas may have both a PEP and a NOT issued for separate activities.

Proclamation of Emergency

A PEP is a communication tool used to inform the public and stakeholders of CDFA’s intended actions. Issuing a PEP is not a requirement; however, CDFA’s policy is to issue a PEP for all chemical treatment programs conducted by PD/EP.

The PEP explains to interested parties that ACP or HLB has been detected and the Department’s intent to conduct delimitation and treatment in a designated area. The PEP explains that the presence of ACP or HLB poses an emergency and can cause harm to the state’s environment, public health, and economy. The PEP details the detections which caused the Department to determine that an infestation exists, the potential integrated pest management options available to deal with the infestation, the option(s) selected to deal with the infestation, environmental consultation conducted, and the legal authority that allows the Secretary to conduct the project. Included with the PEP is a map of the affected area, including any sensitive areas where mitigations are used and the work plan which describes the actions to be taken.

The PEP is distributed to all state and local elected officials who represent the affected area, including mayors, County Boards of Supervisors, State Assemblypersons, and State Senators. It is also distributed to California state and federal agencies that are concerned with treatment projects including but not limited to:

Office of Environmental Health Hazard Assessment
Department of Pesticide Regulation
Department of Fish and Wildlife
California Environmental Protection Agency
United States Fish and Wildlife Service
United States Department of Food and Agriculture
County Agricultural Commissioner
California Environmental Protection Agency

The PEP is also published in newspapers of general circulation that serve the affected area.

Public Information

Prior to undertaking any treatment activity for a property with ACP infected with HLB, CDFA will either contact the affected residents directly, or schedule a public meeting, or a series of public meetings, to inform residents, growers, and other interested parties of CDFA's intent to take action, and to provide technical information about products used, dates of treatment(s), etc. Representatives from the local CAC's office, CDPR, and the OEHHA are present at the meetings to answer questions pertaining to pesticide use, and environmental and/or human health concerns related to the planned treatment. In addition to the public meeting, residents are notified in writing at least 48 hours in advance of any treatment in accordance with Food and Agricultural Code 5779 and following treatments, a post treatment notification is left for the resident, thanking them for their participation and detailing the materials used during the treatment process.

For public notification for an HLB infected tree, the resident of an affected property is provided a confirmation letter either by mail or hand delivery informing them that the tree on their property has been confirmed to be positive for HLB and is subject to mandatory removal. Residents are directed to contact the CDFA toll-free telephone number for assistance. If the resident refuses tree removal or is unavailable for contact, abatement letters and eventually a warrant may be issued.

Press releases are prepared by the CDFA Public Information Officer and/or the CAC. Either the CAC or the public information officer will serve as the primary contact to the media. CDFA in cooperation with the CAC may participate in briefing and/or presentations with local elected officials.

State Interior Quarantine Regulations

ACP

California Code of Regulations Section 3435 was promulgated in 2008 after the first detection of ACP in San Diego County. At that time, the detection of a single psyllid triggered promulgation of the quarantine. The area under quarantine was determined by a 20-mile radius from the detection site. Then the radius was shortened to five-miles to prevent artificial spread. Official quarantine boundaries are established by identifying the roads, including highways, county or private roads and grove roads, and other landmarks that are closest to the circumference created when using the appropriate radius surrounding each detection site.

On November 22, 2017, the University of California and the USDA released a briefing paper that indicated beginning in June 2017, an increase in HLB and HLB positive ACP detections, cities containing HLB, and ACP nymphs. Following the release of the November 22, 2017 briefing paper, the Department has become aware of the growth of HLB. Prior to the release of the paper, the level of HLB risk in California was thought to be stable. This paper also served as a contributing factor for the Emergency ACP Regional Quarantine Regulation that went into effect on January 1, 2018. This grouped entire counties into regional quarantine zones for bulk citrus or citrus nursery stock.

CCR 3435 identifies regulated articles and prohibits movement of regulated articles from the affected area and/or restricts movement of regulated articles within the affected area. Enforcement of these restrictions and prohibitions is conducted through education, outreach, and communication with establishments (i.e.: nurseries, fruit packers and processors, harvesters, grove managers, etc.) inside of quarantine areas. The development and issuance of compliance agreements, exhibits and, when warranted, special permits, is what CDFA uses to communicate specific provisions pertaining to restricted or prohibited movement of regulated articles. Enforcement activities are further detailed in Section IX of this document.

HLB

CCR Section 3439 was promulgated in 2012 after the detection of HLB in Hacienda Heights in Los Angeles County. The provisions of this regulation

pertain to all HLB and ACP hosts and prohibit the movement from, and restrict the movement into and within, the affected area. Enforcement of this regulation, as with the ACP quarantine regulation, is conducted through education, outreach, and communication with establishments (primarily retail and production nurseries) in the affected area.

The detection of a single HLB-infected tree will trigger the expansion of the HLB State Interior Quarantine (CCR 3439).

The HLB State Interior Quarantine regulation will be updated as appropriate if HLB is detected outside of existing quarantines or if the five-mile radius buffers outside of the existing quarantine area.

VII. Detection and Survey Activities for ACP

Urban and Rural Residential Detection Trapping and Visual Survey

Trapping for ACP is a cooperative State/County program to provide early detection of an infestation in a county. The trap used for ACP detection is the yellow panel trap, which is a two-sided cardboard panel coated with an adhesive on each side. ACP becomes entangled on the sticky surface and cannot move off the trap. Yellow panel traps have proven successful at detecting infestations of ACP. At all locations where traps are placed, the host plant is visually inspected for ACP. If ACP is detected, the host will be visually surveyed for additional ACP and symptoms of HLB.

- Trap Density: Five to 16 traps/square miles.
- Trap Servicing Interval: Every two to four weeks.
- Trap Relocation and Replacement: Traps should be replaced and relocated every four to eight weeks to another host at least 500 feet away, if other hosts are available.
- Visual surveys and/or tap sampling are conducted once at each trapping site when the trap is placed.

Commercial Grove Trapping

In counties with substantial commercial citrus production and are not generally infested with ACP, traps are placed within the groves at the density of one trap per 40 acres. Traps are replaced every month and submitted for screening. In areas that are generally infested with ACP, agricultural inspectors visually survey commercial groves for plant tissue displaying symptoms of HLB and collect ACP which are tested for HLB.

Transect Survey

If high or scattered ACP populations are found in the initial inspections, a transect survey may be implemented to rapidly determine the extent of the infestation. This involves inspecting a minimum of 20 properties per square mile and/or placing 20 traps per square mile along eight radii in the cardinal directions (e.g., north, northeast, etc.). Transect surveys extend between five and 20 miles beyond a detection site, depending on the situation.

Delimitation Trapping and Visual Survey Outside of the Generally Infested Area

The protocols below are the actions in response to the detection of ACP in counties north of Santa Barbara County and the Tehachapi Mountains.

Response to the collection one or more ACP

1. Trapping

Density will be 50 traps per square mile in a four-square mile delimitation area centered on the detection site. Traps will be serviced weekly for one month. If no additional ACP are detected, the traps will be serviced monthly for one year past the identification date. Additional detections may increase the size of the delimitation survey area and will restart the one-year clock on the trap servicing requirement.

2. Visual Survey

All find sites and adjacent properties will be visually surveyed for ACP and HLB. Additional sites may be surveyed as part of the risk-based survey.

Screening Glassy-Winged Sharpshooter (GWSS) Traps for ACP

The Pierce's Disease Control Program (PDCP) employs the same yellow panel traps for the GWSS areawide trapping program. PDCP staff screen the traps for GWSS and then they are sent to an ACP screening facility. Traps containing suspect ACP are sent to CDFA's PPDC for confirmation.

County Notification of ACP/HLB Detections

The default method of county notification for ACP comes from the District Entomologist for the affected county, who acts as the liaison between PDEP and the county. The PHPPS Division is first notified of confirmations by the PPDC via communication plan emails. PDEP headquarters then notifies the relevant District Entomologist and other permanent staff in that district regarding the confirmation. It is then relayed to the county. District staff, with guidance and oversight from PDEP headquarters, then work with the county to formulate and execute the initial response if one is needed. In a new ACP or HLB detection area, the CAC is notified directly by PHPPS. A subscription service is also in place via the PDR reporting system that can provide notification directly to the county.

VIII. Detection and Survey Activities for HLB

1. HLB Risk Based Survey

Using risk modeling provided by Dr. Tim Gottwald, USDA, Agricultural Research Service (ARS), the following factors are considered when determining risk associated with HLB:

- Census Travel
- ACP Density
- LAS+ ACP
- Potential ACP Source
- Citrus Road
- Packinghouses
- Farmer’s Markets
- Military and IR
- Organic Citrus
- Weather Suitability

Using these risk factors, total risk is determined for each square mile grid, resulting in a recommended sampling density as shown in table below. Each square mile map is identified by the section, township, range (STR) ID (the unique index). Each STR ID is assigned a Sample Density from Table 1, which is used to determine the number of sites to survey per square mile.

Table 1. Recommended Sampling Density and Number of Survey Sites for HLB in California for 2017

Recommended Sampling Density	Actual of Sites to Survey	# of Square Miles with the Recommended Density	Total # of Sites to Survey
0-5	5	260	1,300
6-20	10	239	2,390
21-40	25	209	5,225

41-80	50	497	24,850
81-160	100	648	64,800
161+	200	291	58,200
Total Number of Sites			156,765

CDFA will use this method to determine the number of sites to sample for each survey cycle. Data obtained from the survey is submitted to the USDA to verify that the Global Position System (GPS) points are within the assigned STR, and then forwarded to Dr. Gottwald. Following Dr. Gottwald’s analysis, in subsequent survey cycles, additional sites or STR’s will be surveyed so that the recommended sampling density will be achieved.

Inspection of Hosts at Survey Site

- All members of the plant family Rutaceae at the site, primarily *Citrus* and *Murraya* species and any other hosts of ACP should be identified.
- Each host tree is visually sectioned into quadrants. Each quadrant is inspected for all ACP life stages (adults, nymphs, and eggs). All detected life stages are collected.
- All hosts at the site are inspected for HLB symptoms. The most common symptom is the blotchy mottle on the leaves (which occurs on all host varieties). The symptoms are better observed in the interior part of the canopy where sun is less likely to obscure the symptoms.
- Plant material should be collected from all hosts displaying symptoms of HLB.
- If HLB symptoms are not observed, but there is a high population of ACP on the host(s), plant material should be collected from the tree(s) that have a high population of ACP.
- All collected plant material and ACP samples will be processed and shipped to CDFA’s PPDC for analysis.

Submission of ACP Samples

- Pour 95% non-denatured ethanol in the aspirator container. Collect adult ACP with an aspirator. Using a pipette transfer the ACP into a vial containing 95% non-denatured ethanol.
- The adult ACP from different hosts on the same property may be pooled into one vial (one vial per site.)

- New growth should be inspected for the nymphs. Nymphs should be collected with a small paint brush or forceps and placed in a vial with 95% non-denatured ethanol. Nymphs from different hosts should not be mixed in the same vial.
- Adult ACP and nymphs should be placed in separate vials. However, only one Pest and Damage Record (PDR) (Entomology) per site should be used.
- Vials should be numbered, beginning with number 1. In the “Remarks” section, indicate the contents of each numbered vial and the host from which the contents were collected.

Examples:

- Sample #1 = 10 nymphs from tree #2 =lemon;
 - Sample #2 = 2 adult ACP from tree #2=lemon.
- Host information should be entered in the host section on the PDR
 - A PDR sticker should be affixed to each vial.
 - All vials with PDR stickers and the PDR should be placed in a plastic bag.
 - Samples should be placed in a cooler with ice packs. The cooler should be sent to the Meadowview warehouse to double check the chain of custody with the contents of the cooler. The cooler will then be taken to the PPD laboratory.

Submission of plant parts

- Twenty (20) symptomatic leaves per tree should be collected.
- Clippers, if used, should be disinfected with 95% non-denatured ethanol. after every sample collection.
- Thorns should be cut off leaves. Leaves should be cleaned with a paint brush to remove any debris, including any ACP life stages present and any other insects.
- Leaves should be placed on a paper towel and thoroughly checked using a magnifying glass to be sure all insects (including ACP) and their life stages are removed. All plant samples submitted to the PPDC must be free of all insects
- Plant samples should be wrapped in a paper towel. Towel(s) with samples should be placed in a Ziploc bag. The Ziploc bag should be placed inside of another Ziploc bag (double Ziploc bagged).
- Using a Sharpie, label the bag with the date, address, city, cross street, county, the host, and the sample number. Place a PDR sticker on the bag or write the PDR number on the bag. Each bag with a sample must have a PDR number.
- Store the Ziploc bag with plant samples in a cooler with ice packs. Place a paper towel between the ice packs and the samples to ensure that the samples stay dry but cool

- One PDR (Plant Pathology) should be completed for each site. Samples from each site should be numbered. If the detection site has multiple trees, there will be one PDR with multiple samples.
- In the “Remarks” section, include the host from which the sample was taken. Examples:
 - ✦ Sample #1= lemon;
 - Sample #2 = grapefruit;
 - ✦ Sample #3 = Mexican lime.
- Host information should be entered in the host section.
- Samples should be placed in a cooler with ice packs. The cooler should be sent to the Meadowview warehouse to double check the chain of custody with the contents of the cooler. The cooler will then be taken to the PPD laboratory.

2. Resampling Properties

Properties that previously had either an HLB positive tree or CLas positive ACP sample and properties that had samples that were inconclusive are resampled by the CDFA. CDFA staff is working to correlate the number of times they have been on these properties and how many inconclusive samples were on that property.

IX. Treatment Activities

Treatment

CDFA's treatment activities for ACP vary throughout the state and depend on multiple factors.

Factors CDFA considers prior to treatment include:

- Determination if suppression of ACP is feasible;
- The proximity of the ACP infestation to commercial citrus;
- Whether growers are conducting coordinated treatment activities;
- The level of HLB risk;
- Consistency with the overall goal of protecting the state's commercial citrus production.

Scenarios throughout the state in which treatment will occur:

- In areas with commercial citrus production that are generally infested with ACP, and where growers are treating on a coordinated schedule; CDFA may conduct residential buffer treatments to suppress ACP populations.
- In areas with commercial citrus production that are not generally infested with ACP; CDFA will conduct residential treatments in response to ACP detections.
- In areas where HLB is detected, CDFA will conduct residential treatments to suppress ACP populations.
- In areas where ACP has not been previously detected, or where ACP has been detected at low densities, CDFA will conduct residential treatments in response to ACP detections to prevent ACP establishment or suppress populations.
- In areas where ACP has been detected along the California-Mexico border, CDFA will conduct residential treatments in response to ACP detections to suppress ACP populations.

CDFA's current policy is to not conduct treatments in areas that are generally infested if there is limited or no commercial citrus production in the area, or if growers in the area are not treating.

Treatment Protocols

In accordance with the integrated pest management principles, the CDFA has evaluated possible treatment methods and determined that there are no physical, cultural, or biological control available to eliminate ACP from an area.

In general, when treatment has been deemed appropriate, CDFA applies insecticides to host trees in the residential (urban) areas in a 50 to 800-meter radius around each detection site. Only ACP host plants are treated.

1. International Border Treatments

CDFA will treat citrus host plants in the residential area within two miles of the California -Mexico border. This treatment will be conducted within a 400-meter buffer surrounding ACP detections that are within two miles of the California-Mexico border, within one year. In this case, a NOT will be issued. A public meeting will be held at least once a year.

2. Within a Generally Infested Area with Commercial Citrus Production

CDFA will treat citrus host plants within a 400-meter buffer surrounding commercial citrus groves if the growers are conducting coordinated treatments in 90 percent of the designated Psyllid Management Area and if ACP have been detected within one mile of the commercial citrus groves within one year. The exception is Imperial County, which has fewer residential properties, and therefore residential citrus host plants will be treated within 800 meters of commercial citrus. A NOT will be issued. A public meeting will be held at least once per year.

3. Outside of the Generally Infested Area

The actions below are in response to the detection of one or more ACP in counties north of Santa Barbara County and the Tehachapi Mountains.

- Detection of one ACP - All properties with hosts within a 50-meter radius of the detection site will be treated.
- Detection of two or more ACP - All properties with hosts within a 400-meter radius of the detection site will be treated.
- A NOT will be issued.
- A public meeting will be held at least once per year.

The actions below are in response to the detection of two or more ACP in Fresno, Madera, Kern, Kings, and Tulare counties.

- Detection of two or more ACP on one trap or one or more ACP detected on separate traps within 400 meters of each other within a six-month period – All properties with hosts within a 400-meter radius will be treated.
- In a commercial citrus environment, where there are few residences in the area, CDFA will treat the residential area within an 800-meter buffer surrounding commercial citrus groves if the growers are conducting coordinated treatments.
- A NOT will be issued.
- A public meeting will be held at least once per year.

4. In response to an HLB Detection

All properties within a 400-meter radius of the detection site will be treated. A NOT and a PEP will be issued. A public meeting will be held at least once per year.

Treatment Methodology

The treatment protocol consists of both a foliar and a systemic insecticide. The foliar insecticide is used for immediate reduction of the adult population to prevent the adults from dispersal. The systemic insecticide is a soil treatment used to kill the sedentary nymphs and provide long term protection against reinfestation. Treatment frequency is dependent on the insecticide applied and severity of the infestation. Treatments will end no later than two years after the last psyllid detection in the treatment area.

CDFA uses registered pesticides and follows the label directions. The treatment protocol may be adjusted to use only the foliar or the systemic insecticide to allow for mitigations in special situations.

Foliar Treatment

Tempo® SC Ultra (beta-cyfluthrin) is a pyrethroid contact insecticide. Treatment will initially occur once, and subsequent applications may occur for up to three times annually if additional psyllids are detected. This material will be applied to the foliage of all host plants using hydraulic spray or hand spray equipment.

Soil Treatment

A systemic soil application will be made using either Merit® 2F or CoreTect™.

- Merit® 2F (imidacloprid), is a neonicotinoid systemic insecticide. Treatment will initially occur once, and a subsequent application may occur once on an annual basis if additional psyllids are detected. This material will be applied to the soil within the root zone of host plants.
- CoreTect™ (imidacloprid) is a neonicotinoid systemic insecticide. It is used in place of Merit® 2F in situations where there are environmental concerns about soil surface runoff of the liquid Merit® 2F formulation, such as host plants growing next to ponds and other environmentally sensitive areas. Treatment will initially occur once, with a subsequent application once on an annual basis if additional psyllids are detected. This material is a pelletized tablet and is inserted into the soil and watered in within the root zone of host plants.

Termination of Treatment

Decisions on termination of treatment in an area will be based on the following factors:

- Adult ACP have been detected scattered over 10 or more sites in at least 6 of the delimitation trapping grids within 6 months;
- Established populations (nymphs and/or eggs) have been found at three or more sites in at least three of the delimitation trapping grids within 6 months;
- At least one property, with nymph(s) and or egg(s) refuses treatment;
- The cost of treatment exceeds available funds;
- Treatment ceases in Fresno, Kern, Kings, Tulare or Madera Counties.

Actions to Replace Treatment

The following actions will be implemented in areas where treatment has been terminated.

- Trapping at the rate of 25 traps per square mile in all delimitation areas will continue, until such time that ACP can be easily collected without a trap find to locate a population.
- Visual survey will be conducted to collect ACP specimens at properties with large numbers of ACP trapped on yellow panel traps (10 or more at one inspection **or** adults collected monthly for three inspections. The ACP will be tested for HLB.
- ACP parasites will be released as appropriate or available.
- The detection of HLB will trigger the HLB protocol.

Environmental Consultation

The treatment area will be reviewed through consultation with the CDFW's Natural Diversity Database for threatened or endangered species. The CDFA also consults with the CDFW, USFWS and NMFS when rare and endangered species are located within the treatment area. Mitigation measures will be implemented as needed. The CDFA will not apply pesticides to bodies of water or undeveloped areas of native vegetation. All treatment will be applied to residential properties, common areas within residential development, non-agricultural commercial properties and rights-of-ways.

Environmental Monitoring

To ensure protection of human health and the environment, the CDFA has contracted with CDPR to oversee environmental monitoring of treatment projects. Sampling media include air, leaf, soil, tank, and water. To address human health issues, CDFA has contracted with OEHHA.

Pollinator Protection

The CDFA takes many beneficial actions to promote pollinator health at our program sites and throughout the state. CDFA works with the local CACs office to identify all registered bee colonies and notifies the registered beekeeper prior to applying any pesticide. CDPR is also consulted to ensure that label directions are interpreted properly and that the applications are made safely. CDFA staff conduct a visual survey of each property prior to making an application and take appropriate precautions to mitigate hazards to pollinators. During treatment activities, CDFA staff follow all label directions, appropriate best management practices, and makes every effort to assure proper timing of applications. Staff remain on site until all water is absorbed into the soil to prevent pollinators from visiting any standing water.

X. Diagnostics

Plant Pest Diagnostics Center (PPDC)

Diagnostic services provided by the CDFA PPDC Plant Pathology Laboratory include:

1. The CDFA PPDC is NPPLAP accredited to conduct Polymerase Chain Reaction (PCR) analysis of plant and insect samples for CLAs.
2. Diagnosis of plant and ACP samples for CLAs submitted by pest prevention programs including state, county, and federal agencies, as well as academic and public sources.
3. Diagnosis of plant diseases from samples submitted by individual farmers, pest control advisors, UC cooperative extension agents, nurserymen, arborists, homeowners, government municipalities, educational institutions, and others.

The CDFA PPDC Laboratory uses two USDA validated multiplex TaqMan Real-time PCR assays for the detection of the HLB-associated bacteria in plants. For screening plant samples, a CLAs/CLam-specific 16S rDNA-based real-time PCR test combined with the plant cytochrome oxidase (COX) positive internal control is used (Li et., 2006). For retesting plant samples that produce a signal with the initial screening test, the Ribonucleotide Reductase (RNR) gene based real-time PCR duplexed with the plant COX positive internal control is used (Zheng et al. 2016). In addition, plant samples are retested using the singleplex CLAs and singleplex CLam real-time PCR. For further confirmation of suspect positive plant samples, a conventional PCR test is used to amplify a fragment of the β -operon gene specific to CLAs for sequence analysis (Hocquellet et al. 1999).

For screening ACP samples, a CLAs-specific 16S rDNA-based real-time PCR test combined with a psyllid glycoprotein (WG) gene-based, probe/primer set as a positive internal control is used (Li et., 2008). For retesting ACP samples that produce a signal with the initial screening test, the CLAs 16S based real-time assay is repeated. In addition, the RNR gene based real-time PCR duplexed with a psyllid WG positive internal control is performed.

Diagnostic services provided by the CDFA PPDC Entomology Laboratory include:

1. Insect identification services to the Division's pest prevention programs, other government agencies, and the public in an accurate and timely fashion.
2. Assist personnel in other agencies with problems related to insects and other arthropods and invertebrates.

University of Arizona (UA)

The UA laboratory is NPPLAP accredited to conduct PCR analysis of plant and insect samples for CLAs and is contracted by CDFA to screen ACP samples for CLAs.

For screening ACP samples, a CLAs-specific 16S rDNA-based real-time PCR test combined with a psyllid WG gene-based, probe/primer set as a positive internal control is used (Li et., 2008). For retesting ACP samples that produce a signal with the initial screening test, the CLAs 16S based real-time assay is repeated.

Citrus Research Board (CRB)

The CRB laboratory in Riverside, California is NPPLAP accredited to conduct PCR analysis of plant and insect samples for CLAs and is contracted by CDFA to screen samples of ACP and plants for CLAs. This lab is designated to process thousands of ACP samples for CLAs detection that have been redirected by the CDFA lab.

For screening ACP samples, a CLAs-specific 16S rDNA-based real-time PCR test combined with a psyllid WG gene-based, probe/primer set as a positive internal control is used (Li et., 2008). For retesting ACP samples that produce a signal with the initial screening test, the CLAs 16S based real-time assay is repeated. In addition, the RNR gene based real-time PCR duplexed with a psyllid WG positive internal control is performed.

Citrus Pest Detection Program (CPDP)

The CPDP laboratory is contracted by CDFA to screen samples of ACP for CLAs.

For screening ACP samples, a CLAs-specific 16S rDNA-based real-time PCR test combined with a psyllid WG gene-based, probe/primer set as a positive internal control is used (Li et., 2008). For retesting ACP samples that produce a signal with the initial screening test, the CLAs 16S based real-time assay is repeated. In addition, the RNR gene based real-time PCR duplexed with a psyllid WG positive internal control is performed.

XI. HLB Response Activities

Because HLB is the most devastating disease of citrus worldwide, California cannot afford to allow the spread of HLB through our state. The presence of this disease in areas such as Asia, Brazil, Texas and Florida have afforded the opportunity to learn from their experiences, including the best available options to prevent the spread and establishment of this pathogen.

Experts worldwide agree on three critical steps in HLB control:

1. Abatement procedures to remove infected trees.
 - a. Removal methods may include, but are not limited to, cutting and burning on site, defoliation and burn standing, cut and buck up for double bagging and disposal at landfill, by burial, or stump removal by mechanical means.
2. ACP control.
3. Replant with disease-free trees, which necessitates that all citrus nursery stock be produced under protective structures.

Each instance will be evaluated on a case by case basis and response activities may include the following:

1. Residential Property Response

Host plant tests positive for HLB-associated *Liberibacter* - Mandatory

1. Upon confirmation of an HLB infected citrus tree or host plant, apply Tempo® SC Ultra to the infected plant.
2. After treatment has dried and following the re-entry interval (REI) on the label, remove and destroy the diseased citrus tree or host plant per the abatement procedures. Completely remove the stump by mechanical means.
3. Initiate standard 400-meter radius delimitation survey.
 - a. Collect tissue samples from all host plants.
 - b. Examine all host plants for evidence or presence of ACP and collect all specimens found.
 - c. Send all samples to a NPPLAP accredited lab for analysis for HLB-associated bacteria.
4. Initiate 400-meter treatment, apply both foliar and systemic insecticides to all host plants in the treatment area.
5. If the detection is in an area not quarantined for HLB, establish a quarantine with a five-mile radius from the find site with CAC concurrence. If an HLB quarantine already exists but does not include all areas within the five-mile radius, expand the existing quarantine.

6. Place all host plants remaining on the property on hold.
7. Collect any trace back information on the source of the diseased plant if available.

ACP tests positive for HLB-associated Liberibacter - Voluntary

1. If an inoculative adult ACP is found feeding on a host plant, the plant on which the insect was found feeding should be considered “highly” suspect for HLB and routinely monitored.
2. If an inoculative ACP nymph is found on a host plant, the CDFA will treat and remove the host plant, citing FAC Section 5762, which states that “Any pest...exposed to infestations...within such area, are public nuisances, which are subject to all laws and remedies which relate to the prevention and abatement of public nuisances.”
 - a. A CLas positive ACP nymph can only acquire the bacteria via:
 - i Feeding on a CLas-positive tree,
or,
 - ii Transovarial transmission (acquisition from the mother to the egg).
 - b. Studies suggest any CLas infected ACP nymph should be interpreted as having inoculated the tree. Finding an ACP nymph on a tree provides the proximity for “exposure.” The science suggests that the risk of infection is present (100 percent of trees from which positive nymphs have been collected are likely infected), and the risk of infection more than qualifies as “exposure.”
3. Initiate standard 400-meter radius delimitation survey.
 - a. Collect tissue samples from all host plants.
 - b. Examine all host plants for evidence or presence of ACP and collect all ACP specimens found.
 - c. Send all samples to a NPPLAP accredited lab for analysis for HLB-associated bacteria
4. Initiate a 400-meter treatment, apply both foliar and systemic insecticides to all host plants within 400-meters.
5. A CLas-positive ACP will **not** trigger a quarantine.

2. Commercial Grove Response

Grove definition: contiguous citrus with edges defined as spacing between plantings larger than a wind machine row.

Host plant tests positive for HLB-associated Liberibacter - Mandatory

1. Upon confirmation of an HLB-infected citrus tree, CDFA will notify the grower. The grower will be required to treat the tree with a foliar insecticide from the UC-approved list of insecticides for bulk citrus treatment within 72

hours of notification. The list is posted on the CDFA web site (<https://tinyurl.com/hlbmitigations>).

2. After the REI on the label, the grower must remove and destroy the diseased citrus tree per the abatement procedures. CDFA will verify removal within 48 hours of the REI. If the tree has not been removed, CDFA will remove the tree and charge the grower for the cost of treatment and removal activities.

Removal may include cutting the tree down and removing the stump or pushing the infected tree completely out of the ground and allowing the tree to completely dry. The stump must be completely removed. Monitor for suckers or resprouts, as they are very attractive to ACP. If suckers or resprouts are found, the grower should be directed to remove them.

3. Initiate a survey of all citrus trees on the perimeter (all end rows/trees in all directions) of the affected grove and all groves within 400-meters.
 - a. Collect leaf tissue samples from all citrus trees.
 - b. Examine all citrus trees for evidence or presence of ACP and collect all ACP specimens found into alcohol or 95% non-denatured ethanol.
 - c. Send all samples to a NPPLAP accredited lab for analysis for HLB-associated bacteria.

Note: If any portion of a site identification (ID) is intersected by the 400-meter radius, the entire grove associated with the site ID must be included in the survey area

4. Initiate a 400-meter treatment protocol. CDFA will communicate to growers who are in the 400-meter treatment area. Growers are mandated to apply one or two UC-approved insecticide treatments for bulk citrus from the list posted on the CDFA website (<https://tinyurl.com/hlbmitigations>) to all host plants within 400-meters of an HLB positive citrus tree or host plant. One foliar treatment is required if the grower has been participating in an areawide treatment program. Two treatments are required if the grower has not been participating in an areawide treatment program. The first treatment is a foliar. If the grower chooses not to comply with the first foliar treatment within seven days, then CDFA will apply the insecticide and charge the expense to the grower. If the second treatment is a foliar, then it should be applied 30-60 days after the first treatment. If the second treatment is systemic, then it should be applied within two weeks of the first treatment.

Note: If any portion of a site ID is intersected by the 400-meter radius, the entire grove associated with the site ID must be included in the treatment area.

5. If the detection is in an area not quarantined for HLB, establish a quarantine with a five-mile radius from the find site with CAC concurrence. If an HLB quarantine already exists but does not include all areas within the five-mile radius, expand the existing quarantine.

6. Place all host plants remaining on the property on hold.
7. Collect trace back information on the source of the diseased plant if available.
8. Resample the perimeter of all groves within 400-meters of a CLas-positive detection once a year with a direct testing method.

ACP tests positive for HLB-associated Liberibacter - Voluntary

1. If the inoculative ACP adult is found feeding on a citrus tree, the plant on which the insect was found feeding should be considered “highly” suspect for HLB and routinely monitored.
2. If an inoculative ACP nymph is found on a citrus tree, the CDFA will ask the grove owner to treat and remove the tree (following the same procedures for an HLB positive tree), citing FAC Section 5762, which states that “Any pest...exposed to infestations...within such area, are public nuisances, which are subject to all laws and remedies which relate to the prevention and abatement of public nuisances.” If the tree is not treated and removed voluntarily, CDFA may treat and remove the tree per FAC 5762 and charge the grower for the cost of removal activities.
 - a. A CLas-positive ACP nymph can only acquire the bacteria via:
 - i Feeding on a CLas-positive tree,
 - or,
 - ii Transovarial transmission (acquisition from the mother to the egg).
 - b. Studies suggest any CLas infected ACP nymph should be interpreted as having inoculated the tree. Finding an ACP nymph on a tree provides the proximity for “exposure.” The science suggests that the risk of infection is present (100 percent of trees from which positive nymphs have been collected are likely infected), and the risk of infection more than qualifies as “exposure.”
3. Initiate survey of all host plants on the perimeter (all end rows/trees in all directions) of all groves within 400-meters of the detection.
 - a. Collect leaf tissue samples from all host plants.
 - b. Examine all host plants for evidence or presence of ACP and collect all ACP specimens found into alcohol or 95% non-denatured ethanol.
 - c. All samples are sent by CDFA to a NPPLAP accredited lab for analysis for HLB-associated bacteria.

Note: If any portion of a site ID is intersected by the 400-meter radius, the entire grove associated with the site ID must be included in the survey area.
4. Initiate a 400-meter treatment protocol. CDFA will communicate to growers who are in the 400-meter treatment area. The grower will be asked to apply one or two insecticides from the list of UC approved insecticide treatments for bulk citrus, posted on the CDFA website (<https://tinyurl.com/hlbmitigations>) to all host plants within 400-meters of a

CLas positive ACP. One foliar treatment is suggested if the grower has been participating in an areawide treatment program. Two treatments are suggested if the grower has not been participating in an areawide treatment program. The first treatment is a foliar. If the second treatment is a foliar, then it should be applied 30-60 days after the first treatment. If the second treatment is a systemic insecticide, then it should be applied within two weeks of the first treatment.

Note: If any portion of a site ID is intersected by the 400-meter radius, the entire grove associated with the site ID must be included in the treatment area.

5. A CLas-positive ACP will **not** trigger a quarantine.
6. Resample the perimeter of all groves within 400-meters of CLas-positive ACP detections once a year with a direct testing method.

3. Nursery Response

Host plant tests positive for HLB-associated *Liberibacter* - Mandatory

1. Upon confirmation of an HLB infected citrus tree (or host plant), CDFA will notify the nursery and place all host plants at the nursery on hold. The detection triggers survey and testing of host plants within 400-meters of the find site.
2. If the detection is in an area not quarantined for HLB, establish a quarantine with a five-mile radius from the find site with CAC concurrence. If an HLB quarantine already exists but does not include all areas within the five-mile radius, expand the existing quarantine.
3. During the quarantine approval and implementation process, CDFA may use its statutory authority to issue hold notices to all nurseries with host plants within the proposed quarantine area. Once the quarantine becomes effective, a follow-up letter is issued to each nursery to provide CDFA contact information and options on how to proceed. The options include either placing and maintaining the plants in a Department approved insect resistant structure for a minimum of two years with testing or voluntarily destroying the plants. Nurseries are required to contact CDFA with their decision and will then be given further instructions.
4. If HLB is detected within a Department approved insect resistant structure, all host nursery stock within the structure may be destroyed.
5. Host nursery stock within the HLB quarantine that has been grown and maintained within an APHIS approved exclusionary facility will be placed on hold until two sampling and testing cycles, six months apart, have been completed with negative results. Nurseries actively participating in the voluntary HLB sampling and testing program will be treated accordingly.

6. If HLB is detected on nursery stock within an APHIS approved exclusionary facility, all nursery stock in that compartment may be destroyed after a risk assessment analysis.

ACP tests positive for HLB-associated Liberibacter - Voluntary

1. Upon confirmation of a CLas infected ACP in a nursery, CDFA may place host plants within the nursery on hold until plant samples are taken and tested.
2. All nurseries within 400-meters of the detection will be notified of the detection and treatment. CDFA will communicate to nurseries that are in 400-meter treatment area. The nursery is asked to treat all exposed nursery stock using CDFA approved insecticides.
3. CLas positive ACP will **not** trigger a quarantine.

XII. Biological Control Activities

Complementing CDFA's ACP treatment actions, and the ACP containment actions carried out through enforcement of the State Interior Quarantine, is a classical biological control program aimed at reducing the population of ACP in highly infested areas. The goal of this program is to significantly reduce the abundance of ACP in heavily infested areas to slow the outward spread of this pest into new areas.

The ACP biological control efforts in California are multifaceted, and developed and implemented through cooperation between CDFA, USDA, CRB, California State University (CSU), and UC.

Two potential ACP biocontrol agents (parasitic wasps *Tamarixia radiata* and *Diphorencyrtus aligarhensis*) have been identified and collected from climatically matched areas of Pakistan by UC Riverside. Releases of *T. radiata* by UC Riverside and CDFA started in December 2011. *D. aligarhensis*, was initially released in December 2014. As of 2017, the release of *D. aligarhensis* is no longer supported or maintained.

The CDFA ACP biocontrol program is composed of three major areas of focused activities and continued development:

- Mass production of ACP and the parasitic wasp, *T. radiata* in conventional insectaries located at CDFA's Mt. Rubidoux facility (Riverside County) and the CSU Pomona campus (Los Angeles County). Operations at each facility are carried out under the terms of a CDFA-issued permit, as required by FAC Section 6305. Rearing of ACP and the parasite occurs on potted trees inside secured cages in controlled rearing rooms. Standard protocols for the large-scale production of *T. radiata* have been developed in Florida and Texas and are being adapted for use in California.
- Production of small, potted citrus trees (especially curry leaf, *Berbera koenigii*) which are used as ACP host material in the Mt. Rubidoux and Pomona insectaries. Production of trees is at CDFA's Arvin facility (Kern County)
- Production of *T. radiata* on caged, field trees at CSU, Pomona and at selected commercial groves near Riverside. This project is funded by USDA. The caged trees at CSU Pomona are located in a 20-acre field next to the insectaries described above. The caged trees in commercial groves are located near the campus of the UC Riverside. At all locations, the cages trees are intentionally and naturally inoculated with ACP. Once high populations of ACP are achieved, adult *T. radiata* are introduced into the cages and allowed to increase in number on the resident psyllids.

Production of *T. radiata* in the field cages has significantly increased the number of parasites available for release but is limited to the spring and summer months of the year.

Initial releases of *T. radiata* were focused within the Los Angeles basin. Post-release monitoring has confirmed the establishment of *T. radiata* at over 80 locations. Until 2014, release sites were selected by scouting and information obtained from interested parties. The steady increase in parasite production because of the field cages and continued expansion of production at Mt. Rubidoux and CSU Pomona has resulted in the initiation of an area-wide release strategy covering all urban regions in southern California and into the southern Central Valley within the ACP quarantine areas.

As of 2018, there have been augmented releases in areas surrounding HLB eradication areas. Current production is over three million a year.

XIII. Regulatory Activities

General

Intrastate and interstate movement of hosts of ACP and HLB are regulated by Title 3, CCR Section 3435, State Interior Quarantine and Code of Federal Regulations (CFR) Section 301.76, CG and ACP, respectively. These regulations specify the quarantine areas, the hosts and possible carriers, and the prohibitions or conditions which enable movement of hosts within or from the quarantine area.

On January 1, 2018, the ACP State Interior Quarantine was amended and repealed all existing Title 3 quarantine zones. It was amended to reflect a regional quarantine which was designated into ten regional quarantine zones. It also established an appeal process for interested parties to use to challenge inclusion of a county or portion of a county in a specified regional zone and a list serve subscription for purposes of receiving updates in regional quarantine zones. It also adopts provisions specifying certain exemptions and movement restrictions for host nursery and bulk citrus fruit.

In conjunction with USDA and the CACs, CDFA enforces all provisions of these regulations, and provides guidance to affected industry representatives of the conditions and actions which would make regulated products eligible to move within and beyond the quarantine boundaries.

In general, regulatory enforcement activities are intended to prevent the spread of ACP and HLB by restricting the movement of host material from the regulated area. Regulatory activities conducted by CDFA include the development and issuance of hold notices and compliance agreements and exhibits; the development and distribution of Pest Exclusion and Phytosanitary Advisories, which provide detailed information on applicable regulations and enforcement policies, development and sharing of education material provided to affected entities and CAC regulatory staffs on applicable regulations and enforcement policies; and on-going communication with and monitoring of regulated establishments within the affected area to ensure compliance with the requirements of the applicable quarantine regulations.

The CDFA, under the terms of a voluntary compliance agreement, can pre-approve an exclusionary facility that meets the USDA Citrus Nursery Stock Protocol's requirements prior to a quarantine being enacted. This will allow uninterrupted intrastate and interstate nursery stock shipments. The local CAC is responsible for approving the exclusionary facilities design and construction. After approval, the facility is inspected at least once every 30-days to confirm compliance with the Protocol's requirements.

In addition to the requirements regarding ACP and HLB, all citrus nursery stock produced and/or sold in California must meet the requirements found in Title 3, CCR Sections 3701 through 3701.8, Citrus Nursery Stock Pest Cleanliness Program (NSPCP). All source trees for citrus nursery stock propagative materials must be registered with the Citrus NSPCP and must meet testing and maintenance requirements.

Summary of ACP Regional Quarantine:

CCR Section 3435 Subsection (b)(1) establishes that a county or portion thereof shall be included in the appropriate host nursery stock regional quarantine zone and bulk citrus regional quarantine zone when: 1) Survey results indicate an ACP or HLB infestation is present or not. The presence or absence of an ACP or HLB infestation is determined by regularly scheduled detection surveys conducted throughout the state in commercial and residential citrus. (2) The local California County Agricultural Commissioner has been notified and requests the quarantine. (3) Notification of the regional quarantine zone change, including a map of the host nursery stock regional quarantine zones and/or bulk citrus regional quarantine zones, a written description of the boundaries of the regional quarantine zones, the Department's evaluation of the pest risk factors associated with the county or portion thereof, and instructions on the process to appeal the designation of a county or portion thereof into a regional quarantine zone, is posted to the Department's website.

CCR Section 3435 Subsection (b)(1) also establishes that any Individual or local entity may receive notification about changes to the regional quarantine zones, including through a list serve subscription. The list serve will function as a form of active communication to provide current and immediate updates on changes in regional quarantine zones. Any Individual or local entity may choose to subscribe to the list serve to receive such updates.

CCR Section 3435 Subsection (b)(1) establishes that any Individual or local entity may appeal a regional quarantine zone designation, describes the process to do so, requires the Department to respond in writing within 10 working days following receipt of the appeal, and that the designation of a county or portion of a county into a host nursery stock and bulk citrus regional quarantine zone shall remain in effect during the appeal.

CCR Section 3435 Subsection (b)(2) establishes the pest risk factors considered by the Department when including a county or portion thereof in a regional quarantine zone.

CCR Section 3435 Subsection (c)(4) establishes that citrus fruit in bulk containers or bins or any citrus fruit with leaves and stems attached, including associated

green waste, is a host and possible carrier of ACP. Green waste associated with bulk citrus, such as stems, and leaves removed from bulk citrus during the cleaning process, is a risk for the spread of ACP that may not move within or from a regional quarantine zone unless the pest risk has been adequately mitigated. Bulk citrus is listed in the current regulation as a host with restricted movement within and from any area under quarantine for ACP. The amended regulation takes the necessary step of restricting the movement of green waste associated with bulk citrus in order to ensure that the pest risk is adequately mitigated after the fruit has been cleaned, graded, and packed, at which point the fruit is exempt. (Green waste, such as leaves and stems of bulk citrus, is removed at the initial stages of the citrus cleaning, grading, and packing process, and does not undergo adequate pest risk mitigation steps as does the fruit.)

CCR Section 3435 Subsection (c)(5)(A) establishes a quarantine regulation exemption for defoliated, dormant, bare-rooted host nursery stock.

CCR Section 3435 Subsection (c)(5)(B) establishes a quarantine regulation exemption for defoliated, dormant nursery host stock in containers where all leaf litter and any weeds have been removed.

CCR Section 3435 Subsection (c)(5)(C) establishes a quarantine regulation exemption for host fruit commercially cleaned, graded, and packed within a bulk citrus regional quarantine zone allowing it to move within or from the zone.

CCR Section 3435 Subsection (c)(5)(D) establishes a quarantine regulation exemption for noncommercially cleaned host fruit for personal consumption and under 25 pounds in weight. Such fruit may move within and from a bulk citrus regional quarantine zone if free of all stems and leaves.

CCR Section 3435 Subsection (c)(5)(E) establishes a quarantine regulation exemption for green waste associated with bulk citrus fruit covered in Section 3435 Subsection (c)(4). This exemption allows green waste of bulk citrus fruit to move within a bulk citrus regional quarantine zone. Bulk citrus fruit is prohibited from moving within or from a regional quarantine zone unless moved under the terms of a special permit (CCR 3435 Subsection (d)(2)(A)). Movement of green waste from a regional quarantine zone may occur only under the terms of a special permit.

CCR Section 3435 Subsection (d)(1)(A) establishes restrictions that prevent any host nursery stock or other potentially infested article and commodity from moving out of Host Nursery Stock Regional Quarantine Zones 2 or 3 unless moved under the terms of a special permit. Additionally, all host nursery stock offered for sale or distribution must be treated in a Department approved manner and bear a zone-

specific label stating it may not be moved outside of the nursery regional quarantine zone. Quarantine requirements to appropriately treat and label regulated nursery stock is a requirement in the current regulation.

CCR Section 3435 Subsection (d)(1)(B) establishes that articles or commodities originating in Host Nursery Regional Quarantine Zone 1 may be moved directly through and delivered to another host nursery regional quarantine zone without delay and by a direct route in an enclosed vehicle or container or completely enclosed by a covering to prevent exposure to ACP while transiting the zone.

CCR Section 3435 Subsection (d)(2)(A) establishes that bulk citrus and associated green waste covered in Section 3435 Subsection (c)(4) are prohibited from moving within or from a bulk citrus regional quarantine zone unless moved under the terms of a special permit.

CCR Section 3435 Subsection (d)(2)(B) establishes that articles or commodities originating in Bulk Citrus Regional Quarantine Zone 1 may be moved directly through and delivered to the other bulk citrus regional quarantine zones without delay and by a direct route in an enclosed vehicle or container or completely enclosed by a covering to prevent exposure to ACP while transiting the other quarantine zones.

CCR Section 3435 Subsection (d)(3) establishes restrictions that prevent possible carriers of ACP from moving out of a regional quarantine zone unless treated or cleaned in an approved manner.

Tarping Requirement

All bulk citrus transporters/haulers are required to completely safeguard citrus fruit while in transit within or from a bulk citrus regional quarantine zone. Safeguarding of fruit can be accomplished in any manner that prevents the fruit from being exposed to ACP and any loss of fruit, leaves, stems, branches, or plant debris while in transit. The safeguards must be in place prior to the vehicle departing with fruit and must remain in place until the vehicle reaches its final destination for offloading.

Issuance of Hold Notices

Hold notices are issued under authority provided in FAC Sections 5701-5704 in order to prevent the movement of hosts from a premise where a pest has been detected. As per this authority, hold notices may be issued for all ACP or HLB hosts on any premise up to five miles from a site where either of these pests have been detected.

Issuance of Compliance Agreements

Compliance agreements are issued under authority provided in FAC 5705. Compliance agreements are used to convey the terms of a State Interior Quarantine to affected businesses in the area, and to receive agreement from the business's responsible party that the quarantine restrictions will be met. Compliance agreements allow the movement of host material under prescribed conditions under general regulatory oversight. Shipments made under the terms of a compliance agreement do not require regulatory supervision.

Issuance of Special Permits

The interior quarantine regulations for both ACP and HLB authorize CDFA to issue special permits pertaining to the movement of the regulated articles and host commodities covered which would otherwise be prohibited. This may occur when there is a specific demonstrated need and the terms and conditions of the permit adequately mitigate the biological risk. These special permits are called quarantine commodity permits and may be issued to individuals, businesses, researchers, or to the CDFA program staff. The permit may be self-executing, having all the terms and conditions in the body of the permit or it may require the permit participants to enter into compliance agreements.

Permits issued to the program staff are generally referred to as "Master Permits" as it enables them to utilize compliance agreements for numerous participants and create a regulatory network for those involved. As an example, for the movement of bulk citrus, the compliance agreements can link the grower to hauler/transporter and hauler/transporter to the packing facility or processor. All new permit requests/concepts are first vetted through the ACP/HLB Incident Commanders. Additionally, most master permits for intrastate movement have requirements which are substantially the same as the federal requirements for interstate movement. Special permits have been issued for the movement of: nursery stock and propagative material, bulk citrus, mandarins with attached stems and leaves, freeze damaged fruit, removal of HLB suspect trees for research, and collection of leaves for destructive nutrient analysis.

Additionally, federal and state plant pest permits have been issued as appropriate to support research activities related to ACP and HLB. The federal permits are applicable when the research involves the interstate movement of regulated/prohibited organisms into California. State permits are required for the intrastate movement and use of such organisms. A federal permit was issued to internationally move the biocontrol organism *T. radiata* with its ACP host into Florida to establish a colony. A portion of that colony was subsequently moved interstate under another federal permit into California to the UC Riverside's Contained Research Facility. Once it was determined that the ACP/*T. radiata* colony was not contaminated by other organisms, the federal permit was modified

to allow experimental release into California. Eventually the federal permit requirements were dropped, and this activity now takes place under the terms of a State permit, since you have to move live ACP with the parasite in it. State plant pest permits have also been issued to researchers to maintain ACP infested nursery stock to screen for efficacious conventional and organic pesticides under California conditions.

Title 3, CCR Section 3154 of the California Code of Regulations authorizes CDFA to issue special permits which provide options for movement of articles otherwise prohibited movement by the quarantine regulations. CDFA has issued the following permits for intrastate movement of articles prohibited movement by CCR 3435:

Master Permit QC 1464

CCR Section 3435 prohibits bulk citrus fruit and any fruit with stems and leaves attached from moving within or from an ACP regional quarantine zone. Master Permit QC 1464 provides the following options for movement:

- All growers, transporters, and packers/processors handling bulk citrus fruit must be operating under the terms of a valid compliance agreement.
- Citrus fruit may be moved to a packer/processor located in the same bulk citrus regional quarantine zone if the fruit is completely safeguarded in transit.
- Citrus fruit to be shipped to packer/processor in a different regional quarantine zone must either be field cleaned by machine to be free from stems and leaves or the grove must be treated within fourteen days of harvest with a recommended pesticide effective at controlling ACP.
- Citrus fruit either field cleaned or preharvest treated must be accompanied by the applicable "ACP-Free Declaration" Form.
- Other performance-based options may be proposed by an interested party and is subject to review and approval by CDFA.

Master Permit QC 1386

This permit allows for the movement of Mandarin fruit with stems and leaves for intrastate shipment within and from an ACP Bulk Citrus Regional Quarantine Zone. Prior to moving, all mandarin fruit shall meet the requirements of applicable exhibits. These compliance agreements and exhibits shall be used by the county agricultural commissioner. All mandarin fruit with attached stems and leaves in bulk containers or bins, and produced inside ACP Bulk Citrus Regional Zones 2-7 must follow pest mitigations measures. These measures include field cleaning, or a pre-harvest or post-harvest treatment. This fruit must also be safeguarded the entire time while in transit, in a fully enclosed vehicle.

Master Permit QC 1289

CCR Section 3435 prohibits regulated green waste from being moved out of the bulk citrus regional quarantine zone. Regulated green waste may be moved to approved destinations under the terms of this special permit. Stipulations included under this permit include destination of green waste to an approved facility, use of an approved green waste processing and handling method(s), and on-going ACP trapping and monitoring of the approved receiver by the local county agricultural commissioner's office.

Master Permit QC 1306

Leaves for consumption that are ACP hosts are prohibited from moving out of the regional quarantine zone. Master Permit QC 1306 authorizes movement of host leaves for consumption if processed. Approved processing methods include heating, drying, picking, shredding, freezing, pureeing, freeze drying, turning into a powder, etc. This permit requires the use of a "Process Verification Statement" with each shipment.

Master Permit QC 1411

Permission for the intrastate movement of unprocessed Kaffir Lime, Curry, and Bael Leaves. Prior to moving the regulated articles, establishments must be operating under a compliance agreement, and regularly verifying current ACP quarantined areas or restricted areas.

The below Master Permits QC 1353, 1359, 1378, 1380, and 1431 all allow for self-certification of nursery shipments under the terms of a compliance agreement. The applicable self-certification document must accompany each shipment from the nursery to destination. A copy of the document must also be submitted to the nursery's local CDFA office prior to shipment.

Master Permit QC 1353

Nursery stock is prohibited from moving out of the nursery regional quarantine zone but may move to any destination under the terms of this permit if the ACP host nursery stock is grown and maintained in an APHIS approved insect-resistant structure and follows the federal protocol entitled "Interstate Movement of Citrus and Other Rutaceous Plants for Planting from Areas Quarantined for Citrus Canker, Citrus Greening, or Asian Citrus Psyllid." Citrus nursery stock produced under the terms of this permit is eligible to be shipped intrastate to all of California and also qualify for federal certification for interstate movement.

Master Permit QC 1359

Enables the movement of ACP and HLB host budwood or buds without leaves and/or host cuttings with leaves from an APHIS approved exclusionary facility in a nursery regional quarantine zone. Stipulations include budwood or buds and host cuttings with leaves transported from the facility must remain in sealed bags or securely closed containers until used, and within the facility they remain in plastic bags and sealed or placed in another type of container which can be securely closed. Host cuttings must also be treated with a Program approved product prior to movement.

Master Permit QC 1378

Allows for the movement of untreated, untagged nursery stock from an APHIS approved facility or production nursery for planting within a nursery regional quarantine zone or HLB quarantine area. The nursery stock must originate from a federally approved insect-resistant structure or an outdoor production nursery. If the nursery stock is grown and maintained outdoors and not from a USDA approved exclusionary facility, the outdoor production nursery must not be located within an HLB quarantine area.

Master Permit QC 1431

Enables treated and untagged nursery stock from an APHIS approved exclusionary facility to be moved to another APHIS approved exclusionary facility or to a receiving nursery within a nursery regional quarantine zone. The nursery stock must originate from a federally approved insect-resistant structure and all establishments involved must be operating under the applicable compliance agreements and exhibits. All nursery stock shipped must be treated in a Program approved manner.

Voluntary Pre-shipment Nursery Treatment Program

All nursery stock offered for sale in ACP Nursery Regional Quarantine Zones 2 or 3 zone must be treated prior to movement within the zone. However, many retail sales locations are unable to treat plants on-site due to pesticide use restrictions, or other factors such as cost or space limitations. Therefore, CDFA has developed a voluntary, pre-shipment treatment program for production nurseries located in ACP Nursery Regional Quarantine Zone 1 (non-infested zone) that can be implemented, with oversight from the local CAC, to facilitate movement of nursery stock into and within ACP Nursery Regional Quarantine Zones 2 and 3.

Interstate Movement

The USDA/APHIS regulates interstate movement of ACP regulated host material and movement of such ACP host nursery stock.

To be eligible to move host nursery stock interstate **to a citrus producing state** or to ACP Nursery Regional Quarantine Zone 1 (non-infested zone), the nursery stock must have been produced and maintained in an approved, insect resistant structure under the terms of a compliance agreement and as per the federal protocol entitled “Interstate Movement of Citrus and Other Rutaceous Plants for Planting from Areas Quarantined for Citrus Canker, Citrus Greening, or Asian Citrus Psyllid.” The terms of the compliance agreement and accompanying exhibit specify the structure construction standards, plant sourcing and testing requirements, and on-going inspection, safeguarding, monitoring, and record keeping requirements. The facility and all its entryways must be designed and constructed to exclude quarantine pests and diseases. This may include but is not limited to screening with openings approximately 0.3 square millimeters or less in size, forced air curtains, positive air pressure, and double door entryways. These requirements ensure that the nursery stock develops in a pest-free environment and will not spread any citrus pests or diseases from the quarantine zone.

Nurseries with an approved exclusionary facility may self-certify interstate shipments

To be eligible to move interstate **to a non-citrus producing state**, the ACP host nursery stock must be inspected every 30 days, treated with an APHIS-approved systemic insecticide (soil drench) at least 30 days but not more than 90 days prior to shipment, and then treated with an APHIS approved foliar spray no more than 14 days before shipment. Shippers must be operating under the terms of a compliance agreement with CDFA and APHIS, and shipments must be accompanied by a Limited Permit. Each plant being moved interstate must be labeled with adequate identifying information to permit trace-back to each premise.

Summary of HLB Quarantine Restrictions

Intrastate

HLB host nursery stock, plant parts, and fruit and (except seed extracted from fruit) are prohibited from moving out of the HLB quarantine area unless they meet the requirements outlined in Title 7, CFR, Part 301.

Also, HLB host nursery stock is prohibited from moving within the area under quarantine unless produced and continuously maintained in a departmentally approved insect-resistant structure under the terms of a compliance agreement. HLB host nursery stock must bear a label stating that it cannot be moved outside the quarantine area. Nurseries with a departmentally approved structure and compliance agreement must also maintain a log of all HLB host nursery stock sold with the buyer’s address and contact information.

Compartmentalization of growing areas within an approved insect-resistant structure will be considered in the case of either ACP or HLB being detected within the structure. If ACP or HLB is detected in an approved insect resistant structure and compartmentalization exists, the Department will complete a risk assessment to determine regulatory response. No further shipments will be allowed from the facility until authorized by the Department.

If ACP is detected and no compartmentalization exists, ACP and HLB-host host nursery stock must either be held for two years and tested for HLB every six months with negative results or destroyed. If HLB is detected in an approved insect-resistant structure and no compartmentalization exists, no further shipments will be allowed, and the nursery stock will need to be removed from the facility and the facility treated in an approved manner.

ACP-only (not HLB) host nursery stock may move within the HLB quarantine area if treated in an approved manner, or if it was produced outside the HLB quarantine area and is transported into the HLB quarantine area to an approved, insect-resistant facility for treatment and/or sale. All ACP-only nursery stock offered for sale in the HLB quarantine area must bear a label stating it cannot be moved outside the HLB quarantine area.

ACP and HLB-host fruit placed directly into bulk containers or bins *without cleaning* is prohibited from leaving the HLB regulated area. Fruit in bulk that has been field cleaned by machine or treated with a preharvest application within 14 days of harvest may be transported to a packinghouse/processor within the same contiguous HLB quarantine area if completely safeguarded in transit. ACP and HLB-host fruit must be either wet washed, or preharvest treated and field cleaned by machine and completely safeguarded in transit to be moved to a packinghouse/processor located outside of the contiguous HLB quarantine area in which the fruit is grown. Once citrus fruit has been cleaned, processed, and final packaged using standard industry packinghouse procedures may be moved within or out of the HLB quarantine area.

All equipment used to harvest, prune, process, or transport any hosts of ACP and HLB must be cleaned and/or treated in a manner to eliminate all live life stages of ACP prior to movement out of the HLB quarantine area.

Interstate

The USDA/APHIS regulates interstate movement of ACP and HLB-regulated articles from HLB quarantine areas.

ACP and HLB regulated host nursery stock may move interstate from an area quarantined for HLB to any state if produced under the terms of a compliance

agreement and as per the federal protocol entitled “Interstate Movement of Citrus and Other Rutaceous Plants for Planting from Areas Quarantined for Citrus Canker, Citrus Greening, or Asian Citrus Psyllid.” The terms of the compliance agreement and accompanying exhibit specify the structure construction standards, plant sourcing and testing requirements, and on-going inspection, safeguarding, monitoring, and record keeping requirements.

In addition, to be eligible for interstate movement, ACP and HLB regulated host nursery stock must be tested at least twice for HLB at six-month intervals with negative results.

Master Permits for HLB Bulk Fruit

Master Permit QC 1337

This permit allows establishments operating under a compliance agreement to move HLB regulated green waste out of an HLB quarantine area. It also allows establishments located outside of the HLB quarantine area to receive the regulated material for proper handling and pest mitigation.

Special Permit 1342

This permit allows the transport of HLB and/or ACP Host Material within and from the HLB Quarantine area for destruction. All host material shall be handled, safeguarded, and transported by Project staff. Plants must be safeguarded by double bagging in a plastic bag or other methods that are approved by the State Primary Entomologist and Plant Pathologist. Host material must be disposed of in an approved manner as stated in the permit.

Special Permit 1346

Allows for the unrestricted movement of citrus host material within and from eradication and quarantine areas of HLB and/or ACP.

Special Permit 1429

Allows the transport of HLB and/or ACP host material from inside of the HLB quarantine area. All host material must be handled, safeguarded and transported by HLB program staff. Plants must be safeguarded during transport by specific methods and all host material shall be disposed of and handled by specific methods.

Master Permit QC 1480

Allows bulk citrus to be shipped within or from an HLB quarantine area. Prior to moving or receiving citrus in bulk containers or bins originating in an HLB quarantine area, the affected growers, haulers, and packers must be operating

under all the terms of the applicable compliance agreement and its exhibits. Citrus fruit in bulk must be field cleaned by machine or treated with a preharvest application within 14 days of harvest before it is transported to a packinghouse/processor within the same contiguous HLB quarantine area and must be completely safeguarded in transit. ACP and HLB-host fruit must be either wet washed, or preharvest treated and field cleaned by machine and completely safeguarded in transit to be moved to a packinghouse/processor located outside of the contiguous HLB quarantine area in which the fruit is grown. Once citrus fruit has been cleaned, processed, and final packaged using standard industry packinghouse procedures, it may be moved within or out of the HLB quarantine area.

Master Permit QC 1503

Allows the movement of mandarin fruit with attached stems and/or leaves into and within an HLB quarantine area. Prior to moving the regulated articles, the affected transporter, haulers, and fruit sellers must be operating under a compliance agreement and its exhibits.

XIV. Outreach and Education Program

The CPDPC requires the services of a professional outreach contractor to oversee an outreach and education program. The program is designed to inform residents of the threat from the citrus disease, HLB, and its vector, the ACP pose to their dooryard citrus. Additionally, growers are kept abreast on the status of HLB and ACP, as well as other pests and diseases of citrus. The outreach and education program will include the following items:

- A work plan including all deliverables and completion dates for all components.
- Messaging that creates an environment of cooperation and support for controlling ACP and HLB among residents, growers, legislators and stakeholders.
- Cohesive, distinctive artwork and graphics to be used on all printed and electronic materials associated with the CPDPC outreach and education program.
- Quarterly newsletters and articles with arrangements to distribute them in existing publications, i.e. *Citrograph*, regional associations, trade press, on the CDFA and CPDPC websites and in the mail.
- A media update guide, including press releases for distribution to local papers, trade press, print media, television, and radio in citrus growing regions.
- Handouts and complementary materials that can be easily updated and produced in short runs for use in trade shows and repurposed for electronic distribution via email, on websites, etc., to provide relevant updates on the CPDPC.
- A program that provides regular updates to regional citrus growers, County Agricultural Commissioners, Farm Bureau chapters, elected officials and local governmental groups, and that provides materials and information for use in local grower meetings, field day activities and trade shows.
- A program to identify, educate and deploy candidates among California's citrus growers, to serve as local experts. These growers will be available for media interviews and public meetings in areas where citrus trees are newly infested with ACP or infected with HLB.
- Speaker kits, including talking points, handouts and visuals, for use in making presentations on ACP and HLB.
- A media outreach strategy that can reach reporters with breaking news in a timely fashion.
- Incorporation of other outreach vehicles/mechanisms (Twitter, Facebook, etc.) upon approval of the CDFA.
- Provide program's outreach materials in multiple languages for distribution via multiple media channels to reach the largest audience.

1. Residential Messaging

Messaging is directed toward residents and will continue in areas of the state where residential treatments for ACP are deemed necessary due to the proximity of commercial citrus. In areas of the state that are either generally infested or do not have substantial citrus acreage, the messaging will focus on finding and eradicating HLB-infested trees. In all areas, the public messaging will emphasize resident cooperation with CDFA survey and treatment crews.

2. Grower Messaging

In some citrus growing areas, commercial groves are separated by substantial distances, making open communication and coordination between growers difficult. Individual growers may have implemented pest management strategies for ACP and HLB, but experience has shown that a successful control program must be coordinated among all growers in an area to maximize the effect of treatments. It is imperative in managing this pest, that outreach messaging directed toward growers emphasizes grower participation in an area-wide pest management strategy to protect commercial citrus as well as individual growers.

To accomplish the timely application of treatments over large geographical areas in a coordinated manner, the outreach materials will be distributed in various ways, including by the contractor, CDFA, Grower Liaisons and the Statewide Grower Liaison Coordinator. Recognizing that the cost of treatments is borne by the citrus growers, it is imperative to have a robust grower outreach program that reaches as many growers as possible to ensure effective treatments are conducted in a timely manner.

XV. Facilitating Research

The CDFA periodically receives requests to facilitate research and is willing to participate if feasible. If a research opportunity arises, the CDFA requests a one-page concept proposal from the requestor. The proposal shall include a brief background of the research, the name of the principle investigator and the number of additional research staff that will be involved in the project. For the description of the project, certain criteria must be met. This includes: the project timeline, the anticipated deliverable, and sample collection needs. If samples are to be collected, the proposal must describe what and where the samples will be collected, where the samples will be moved to, what safeguarding methods being used, and the final disposition of the samples. The anticipated area for the project, how many research staff in the field, and the frequency of the visits also must be described. Additionally, the proposal shall include the funding source, and if the research project is a new or existing project. Proposals will be reviewed for scientific validity and to assess impacts to the CDFA ACP/HLB response program.

Current research facilitation includes providing leaf samples for Dr. Slupsky's metabolomics lab at UC Davis, collecting leaf swabs for Dr. Leveau's microbiome lab at UC Davis, and collection samples for follow-up with Dr. McRobert's early detection technology (EDT) baseline study.

Early Detection Technology

The CDFA solely relies on USDA's work analysis and PCRs to identify and validate positive ACP and positive HLB trees. While other avenues of detection are being explored, currently, EDT's are not validated, and positives discovered from EDT's are treated as suspect and experimental positives only.

Ongoing Support

1. Phytobiome Project – Dr. Leveau
2018: The CDFA lab will be compiling qPCR data on 500 trees that were swabbed in 2017 as part of the phytobiome project. The data will be shared with Johan Leveau.
 - 1.
 2. Citrus Research Board (CRB) Lab
 - a. Ongoing: Processing and shipping ACP samples to the CRB Lab.
 - b. Ongoing: Collaborating on HLB testing procedures.
 3. Citrus Pest Detection Program (CPDP) Lab
 - a. Annually: Preparing and administering the CDFA HLB Proficiency test.

- b. Ongoing: Processing and shipping ACP samples to the CPDP Lab.
 - c. Ongoing: Collaborating on HLB testing procedures.
4. Metabolomics Lab – Dr. Slupsky
2016 – ongoing: Providing the UC Davis Lab lyophilized leaf tissue from confirmed HLB+ trees. To date, this lab has received 175 positive samples.
 5. Dog Survey – Dr. Gottwald and Dr. McCollum
2018: Final quadrant sampling of the 34 dog alerted trees.
 6. United States Department of Agriculture (USDA)/Center for Plant Health Science and Technology (CPHST) Lab
 - a. Ongoing: Sending positive budwood from new detections to CPHST.
 - b. Ongoing: Sending lyophilized HLB+ tissue from new detections for genotyping.
 7. United States Department of Agriculture (USDA)/Agricultural Research Services (ARS) -Dr. Chen
 - a. 2016 - ongoing: Providing ACP DNA to support genotypic studies on the ACP populations in CA.
 - b. Ongoing: Providing CLas positive DNA for genotyping.
 8. CA-1 Project – Dr. McRoberts
1,000 “negative” samples were collected throughout the State to help the EDT Labs establish a baseline for their testing procedures.
2017 - ongoing: Following up on EDT suspects.
Seven EDT labs involved: Metabolomic, PathSensors, Wenbo Ma, McCollum, Vidalakis, Microbiome, (swabbing of leaves), Fink (needle sampling)
 9. 2017 CA-1b Project – Dr. McRoberts
89 samples were collected inside the HLB quarantine zones to provide potential positive/inconclusive samples for the EDT researchers.
2017 - ongoing: Following up on EDT suspects.
Seven EDT labs involved: Metabolomic, PathSensors, Wenbo Ma, McCollum, Vidalakis, Microbiome (swabbing of leaves), Fink (needle sampling)
 10. 2018 CA-1b Project Part II – Dr. McRoberts
200 samples were collected inside the HLB quarantine zones to provide potential positive/inconclusive samples for the EDT researchers.

- a. 2018: CDFA completed processing, preparing, and testing the 200 samples. CDFA is storing the prepared samples at -80°C for the EDT labs.
- b. 2018: Will be following up on EDT suspects.
Three or four EDT labs involved: Metabolomic, PathSensors, McCollum

Future Collaborations

1. 2018 Washington State University (WSU) – Dr. Gang
2018: WSU requested HLB positive budwood for grafting and as source material for culturing California CLas isolates. CDFA will be providing budwood. All budwood material will be tested by CDFA prior to being released.
2. 2018 University of California (UC) Riverside – Dr. Ramadugu
2018: UC Riverside requested budwood infected with aggressive strains of CLas. The strains will be used to challenge citrus rootstock/varieties exhibiting tolerance to the HLB disease. Work is pending until the Riverside BSL3 greenhouse is completed. CDFA will be providing budwood. All budwood material will be tested by CDFA prior to being released.