Citrus Pest and Disease Prevention Division

# California Statewide Action Plan for Asian Citrus Psyllid and Huanglongbing

California Department of Food and Agriculture

cdfa

This document sets forth the California Department of Food and Agriculture (CDFA), Citrus Pest and Disease Prevention Division's (CPDPD) statewide Action Plan for Asian citrus psyllid (ACP) and huanglongbing (HLB). This document details the program implemented by CPDPD to sustain and protect California's commercial citrus production, residential citrus plantings, and natural resources.

Cover Photo: Provided by Nilan Watmore, Environmental Program Manager I, CPDPD.

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## I. Action Statement

The CDFA established the Citrus Pest and Disease Prevention Program (CPDPP) in 2009 to sustain and protect citrus production in the state of California through the implementation of this Action Plan for ACP and HLB. CDFA's CPDPD in collaboration with United States Department of Agriculture (USDA), California County Agricultural Commissioners (CACs), and Citrus Pest and Disease Prevention Committee (CPDPC) administers the CPDPP.

Program elements 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.
- An early detection program for both ACP and HLB.
- An ACP and HLB regulatory program.
- An ongoing dialogue with scientists from the ACP/HLB Ad Hoc Science Advisory Panel (SAP), 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; and
- 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." In 2022 Dr. Bruce Babcock, UC, Riverside, School of Public Policy published an analysis of the economics of California citrus, titled "Economic Impact of California's Citrus Industry in 2020." In this study, the value of California citrus production in the 2020-21 marketing year was determined to be $3.63 billion. The total economic impact of the industry on California's economy in 2020-21 was $7.6 billion. The California citrus industry added $1.9 billion to California's state Gross Domestic Product (GDP) in 2020 and estimated full time equivalent jobs in the California citrus industry in 2020-21 totaled 24,247. Estimated wages paid by the California citrus industry income in 2020-21 totaled $759 million. A 20 percent reduction in California citrus acreage would cause a loss of 8,213 jobs, $214 million in employee income, and reduce state GDP by $569 million.

Citrus production is under threat from several biotic and abiotic stresses. Among the biotic stress, HLB, also known as citrus greening, is most devastating as there is no cure against the disease. ACP, one of only two confirmed vectors, was first detected

in California in 2008. In response, CDFA implemented delimitation and survey techniques through the CPDPP to determine the extent of the infestation, and enacted state interior quarantine restrictions to contain the spread of ACP, the prevalence of HLB and to protect areas where the ACP and HLB was not yet known to occur.

In response to the increasing number of HLB and ACP detections, the CPDPC recommended that CDFA seek dedicated resources to implement the CPDPP. Dedicated resources were secured in the 2019 Budget Act and the CPDPD was established in July 2019. CPDPP activities previously carried out by the Pest Detection/Emergency Projects and Pest Exclusion Branches under the Plant Health and Pest Prevention Services Division of CDFA were transitioned to the CPDPD.

The CPDPD reviews this plan quarterly to ensure all actions are consistent with identified program goals and objectives and will consider adjustments because of new and relevant information and technologies, pest pressures, or other developments. Current scientific findings and recommendations as well as updated federal and state regulations, policies, and/or industry practices are reviewed to ensure CPDPD's actions are coordinated, scientifically based, transparent, and consistent with the goal of protecting California's citrus industry, residential citrus, and natural resources.

## II. Current Status of ACP and HLB

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

Host plants, including citrus trees, have been infected with HLB and/or ACP have been found to be positive for the bacteria associated with HLB, *Candidatus* Liberibacter asiaticus (*C*Las) in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Figure 1 below shows the HLB quarantine area and treatment areas within the quarantine.

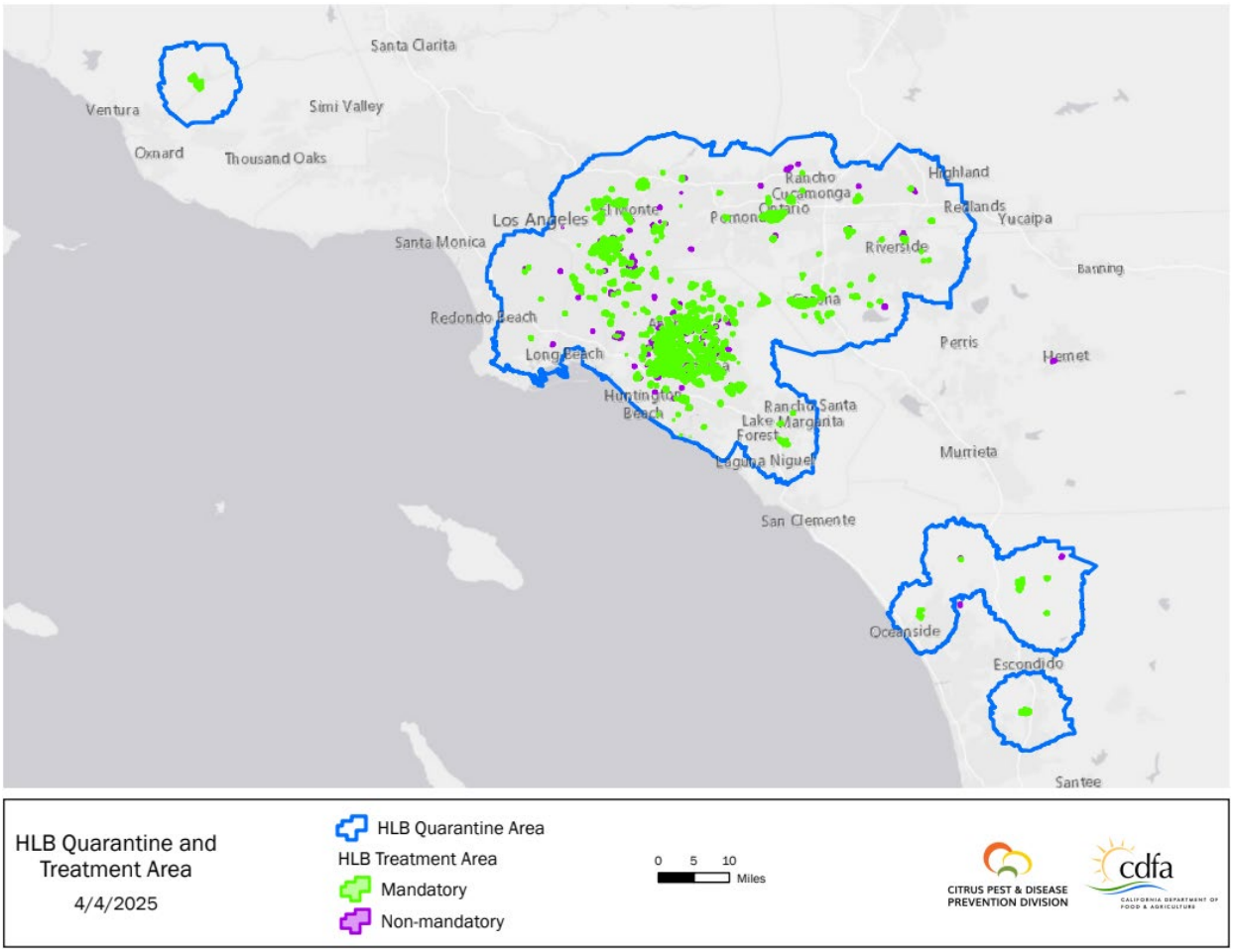


Figure 1. HLB Quarantine and Treatment Areas

Table 1 below shows the number of samples found to be positive for *C*Las in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties.

Table 1. HLB Positive Detections as of 04/04/2025

| City | Sites | Trees | ACP samples |
|---|---|---|---|
| **Orange County** | | | |
| Garden Grove | 751 | 1310 | 124 |
| Santa Ana | 754 | 1237 | 98 |
| Anaheim | 1060 | 1852 | 174 |
| Westminster | 368 | 630 | 23 |
| Orange | 343 | 509 | 45 |
| Tustin | 51 | 65 | 10 |
| Fountain Valley | 15 | 22 | 3 |
| Huntington Beach | 27 | 30 | 2 |
| Placentia | 93 | 128 | 15 |
| La Habra | 13 | 20 | 1 |
| Fullerton | 19 | 23 | 10 |
| Yorba Linda | 83 | 214 | 17 |

| | | | |
|---|---|---|---|
| Irvine | 169 | 216 | 5 |
| Costa Mesa | 113 | 159 | 4 |
| Brea | 34 | 53 | 1 |
| Buena Park | 9 | 16 | 2 |
| Cypress | 5 | 1 | 5 |
| Stanton | 5 | 6 | 1 |
| Midway City | 12 | 26 | 0 |
| Los Alamitos | 1 | 0 | 1 |
| Villa Park | 3 | 6 | 0 |
| Newport Beach | 4 | 4 | 0 |
| Mission Viejo | 19 | 23 | 4 |
| Foothill Ranch | 1 | 1 | 0 |
| **Total** | **3952** | **6551** | **545** |
| **Los Angeles County** | | | |
| Whittier | 231 | 282 | 52 |
| Pico Rivera | 339 | 513 | 73 |
| Montebello | 82 | 113 | 2 |
| San Gabriel | 93 | 125 | 9 |
| Rosemead | 50 | 69 | 7 |
| Paramount | 28 | 35 | 5 |
| La Mirada | 53 | 72 | 6 |
| La Puente | 57 | 69 | 9 |
| Norwalk | 16 | 13 | 5 |
| Cerritos | 7 | 9 | 5 |
| Hacienda Heights | 5 | 5 | 1 |
| Lakewood | 5 | 6 | 0 |
| Duarte | 174 | 268 | 7 |
| El Monte | 73 | 106 | 8 |
| South El Monte | 22 | 43 | 4 |
| Alhambra | 6 | 7 | 0 |
| Temple City | 12 | 11 | 2 |
| Compton | 1 | 1 | 0 |
| Glendora | 1 | 0 | 1 |
| South Gate | 10 | 10 | 6 |
| Long Beach | 14 | 23 | 3 |
| Los Angeles | 8 | 6 | 2 |
| Downey | 28 | 35 | 5 |
| Carson | 4 | 3 | 1 |
| Monrovia | 42 | 61 | 0 |
| Rowland Heights | 2 | 0 | 2 |
| Pomona | 10 | 13 | 2 |
| Artesia | 7 | 8 | 0 |
| Bellflower | 5 | 5 | 0 |
| Monterey Park | 1 | 1 | 0 |
| West Covina | 1 | 0 | 1 |

| | | | |
|---|---|---|---|
| City of Industry | 1 | 2 | 0 |
| Claremont | 1 | 0 | 1 |
| Santa Fe Springs | 2 | 1 | 1 |
| Azusa | 8 | 16 | 2 |
| Covina | 2 | 1 | 1 |
| Commerce | 4 | 5 | 0 |
| San Dimas | 1 | 1 | 0 |
| **Total** | **1406** | **1938** | **223** |
| **Riverside County** | | | |
| Corona | 268 | 395 | 37 |
| Riverside | 39 | 52 | 10 |
| Eastvale | 2 | 2 | 0 |
| Jurupa Valley | 40 | 68 | 4 |
| Moreno Valley | 1 | 1 | 0 |
| Norco | 6 | 11 | 0 |
| Hemet | 1 | 0 | 1 |
| **Total** | **357** | **529** | **52** |
| **San Bernardino County** | | | |
| Rancho Cucamonga | 6 | 7 | 5 |
| Montclair | 23 | 23 | 9 |
| Colton | 6 | 11 | 3 |
| San Bernardino | 2 | 1 | 1 |
| Ontario | 329 | 511 | 22 |
| Fontana | 30 | 47 | 9 |
| Chino | 21 | 31 | 3 |
| **Total** | **417** | **631** | **52** |
| **San Diego County** | | | |
| Fallbrook | 2 | 1 | 1 |
| Oceanside | 4 | 9 | 4 |
| Pauma Valley | 1 | 0 | 1 |
| Vista | 1 | 0 | 1 |
| San Diego | 47 | 75 | 0 |
| Valley Center | 8 | 22 | 2 |
| **Total** | **63** | **107** | **9** |
| **Ventura County** | | | |
| Santa Paula | 51 | 87 | 6 |
| **Total** | **51** | **87** | **6** |
| **Grand Total** | **6246** | **9843** | **887** |

## III. Pest Profiles

### Asian Citrus Psyllid

The ACP, *Diaphorina citri* (Kuwayama), is a small, plant sap-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 to 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 feeds on all varieties of citrus and very closely related ornamental plants in the family Rutaceae. As they feed, ACP produces 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 five instars and range in size from 0.3 mm long in the first instar to 1.6 mm long in the fifth instar. Nymphs are yellow with red eyes and produce white, tubular, waxy secretions which are visible to the unaided eye. The presence of waxy secretions can encourage the growth of sooty mold.

**Huanglongbing/Citrus Greening**

Prior to 2004, HLB, 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 first confirmed in the United States in Florida in 2005. It now occurs throughout Florida, Georgia, Puerto Rico, and the United States Virgin Islands. It has been confirmed in portions of Louisiana, South Carolina, and Texas, and it has been found in residential trees in California (Los Angeles, Orange, Riverside, San Diego, Ventura, and San Bernardino Counties). HLB infects all varieties of commercial citrus and closely related species. HLB is known to be associated with one of three phloem-limiting bacteria, *C*Las, *Candidatus* Liberibacter africanus, or *Candidatus* Liberibacter americanus. The bacteria can be transferred to citrus family (Rutaceae) plants in one of two ways: either by an infected ACP (adult or nymph) as they feed or by grafting infected budwood onto a healthy tree. The bacterium enters the phloem of the plant and blocks transportation of nutrients within the tree. HLB-infected trees bear small, asymmetrical fruits which are partially green, bitter, and unsalable. The disease destroys the appearance and economic value of the trees and eventually causes the death of the tree. Infected trees may have areas with mottled yellow leaves, generally seen in asymmetrical patterns. Infected trees die within three to five years. HLB is one of the most serious plant diseases in the world and currently there is no cure. While feeding on infected trees, presumably healthy ACP adults and nymphs can become infected with *C*Las. Once infected, ACP can transmit *C*Las through feeding as it flies from one host plant to another in the environment.

# IV. Organization, Responsibilities, and Staffing

## The Incident Command System (ICS)

Managing ACP and HLB in California is a coordinated, interagency effort between the USDA/Animal and Plant Health Inspection Services (APHIS), CDFA's CPDPD, and the 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 and represents a threat to the environment and property. Responding to these pests is required to ensure protection of valuable resources. Because federal funding is expended to implement the response, ICS management is used.

The ICS is an action planning process which ensures that all ACP and HLB-related activities are coordinated and communicated to all partners involved and that all activities support 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 facilitates a standardized system of communication, collaborative decision-making, and cost-effective resource utilization.

Representatives from CDFA, CPDPD, 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/APHIS, Plant Protection and Quarantine (PPQ) program is responsible for administering the Citrus Health Response Program (CHRP). The goal of CHRP is to sustain the United States' citrus industry, maintain growers' continued access to export markets, and safeguard the other citrus growing states against a variety of citrus diseases and pests, including ACP and HLB. CHRP provides guidelines for nursery stock production, fruit inspection, treatment, and certification.

The PPQ, Science and Technology (S & T) provides scientific support for PPQ regulatory decisions and operations. S & T is responsible for ensuring that PPQ has the information, tools, and technology to make science-based regulatory and policy decisions. In addition, S & T 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 conduct molecular diagnostics for APHIS-PPQ. The NPPLAP accreditation process ensures accuracy and credibility in the diagnostic determinations that inform regulatory actions.

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. ARS disseminates information to ensure production of 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. Dr. Tim Gottwald, USDA ARS, developed a California based HLB risk model to predict areas in the state where HLB is likely to occur.

The Department of Homeland Security, Customs and Border Protection (CBP) employs agriculture specialists at United States 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**

The CDFA's CPDPD develops, administers, manages, and implements the CPDPP. Program elements include:

- Administration of Federal Agreement(s)
- Urban and Rural Residential Detection Trapping and Visual Survey
- Citrus Grove Trapping and Visual Survey
- Delimitation Trapping and Visual Survey
- ACP Treatment
- Tree Removal
- Regulatory Quarantines
- Public Outreach and Messaging

Within CDFA, the CPDPD and the Plant Pest Diagnostics Center (PPDC) provide different services in support of the ACP and HLB Action Plan:

- CPDPD conducts all aspects of ACP and HLB survey, detection, treatment, mapping, analysis and implementation of the State Interior Quarantine regulations for ACP and HLB.
- PPDC conducts diagnostics pertaining to HLB and ACP.

**Citrus Pest and Disease Prevention Committee**

Food and Agricultural Code (FAC) section 5914 created the CPDPC. The CPDPC is comprised of Secretary-appointed members of the California citrus industry and the public. FAC section 5915 authorizes CPDPC to develop, subject to Secretary

approval, a statewide citrus specific pest and disease work plan that includes, but is not limited to, the following:

- 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.
- 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.
- The amount of fees to be levied, as provided in FAC section 5919.
- The receipt of money from other sources to pay any obligation of the committee and to accomplish the purposes and objectives of the committee.
- The adoption of regulations consistent with the powers and duties of the committee.

**Strategic Plan**

To evaluate and improve its strategies for halting the progression of HLB in California while providing a roadmap for the future, the CPDPC developed a strategic plan. 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 CPDPP. In addition, the CPDPC agreed to align its annual budget supporting the priorities below. The CPDPD and the CPDPC and its subcommittees work together to execute the following:

1. Quickly detect and eradicate diseased trees by improving 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 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.

5. Use outreach and education to encourage homeowners 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 may be employed to provide services to citrus growers. The Statewide Grower Liaison Coordinator acts as the lead over the Grower Liaisons to providing assistance, coordinating meetings and outreach materials on area-wide and program treatment activities, and providing other support as needed.

Grower Liaisons disseminate outreach and education materials to the citrus growers in their assigned area to facilitate coordinated area-wide treatments. At least one Grower Liaison is assigned to work in each of the following counties/areas: Fresno/Madera, Imperial, Kern, Riverside, San Bernardino, San Diego, Santa Barbara/San Luis Obispo, Tulare, and Ventura.

Grower Liaison tasks include:

- Contact and provide ACP/HLB and other program related information to individual growers, Pest Control Advisors (PCA), 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.
- Continually provide updates on changes to the citrus mapping layer in respective areas.
- Document work and submit monthly report to the Statewide Grower Liaison Coordinator.
- Attend monthly Outreach and Operations Subcommittee meetings and CPDPC meetings as feasible.
- Attend grower meetings to provide information on local ACP and HLB issues.

Statewide Grower Liaison Coordinator tasks include:

- Communicate regularly with Grower Liaisons to ensure specific tasks are adequately carried out.
- Communicate regularly with the CPDPD's Director, or designee, and the CPDPC.
- Stay current with the latest ACP research and pesticide treatment information.
- Facilitate communication between citrus growers and CPDPD staff.
- Evaluate effectiveness of the grower outreach and education program.
- Participate in citrus industry-related and grower education programs.

- Attend monthly Outreach and Operations Subcommittee meetings and CPDPC meetings as feasible.

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

**California County Agricultural Commissioner**

The CACs implement federal, state, and local regulatory programs designed to promote agriculture and protect people, the environment, and marketplace equity. The CACs conduct regulatory activities in coordination with the USDA/APHIS, CDFA, CPDPD, 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 regulatory activities to implement the Action Plan for ACP and HLB:

**Pesticide Use Enforcement**

Enforcement of pesticide safety regulations; issuance of restricted material permits; on-site inspection of pesticide applicators; administration of pesticide use reporting; surveillance of dealers, PCAs, and pest control operators (PCO); 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 CPDPD and USDA/APHIS, the CACs conduct ACP trapping and survey programs. Program activities include placing and monitoring traps, screening traps for ACP, submitting traps to approved regional screening locations, submitting traps with suspect ACP to CDFA's PPDC Entomology Laboratory, conducting visual surveys for HLB, and collecting and submitting plant 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 FAC sections 5401-5405. These sections authorize the abatement of a public nuisance – which include any premises, plants, conveyances, or things which are infected or infested with any pest, or premises where any pest is found – and set forth the circumstances under which abatement may occur.

### Pest Eradication

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

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

### Pest Exclusion/Quarantine/Phytosanitary Certification

In conjunction with CDFA, CPDPD, and USDA/APHIS, the CACs enforce the State Interior Quarantine for ACP and HLB which are set forth in California Code of Regulations (CCR), title 3, sections 3435 and 3439. Enforcement actions include, where applicable, the inspection of bulk citrus shipments from areas affected by the quarantine to ensure compliance and enforce the terms of Master Permits. Master Permits issued by CDFA enable the movement of agricultural commodities where otherwise prohibited by quarantines.

CACs provide information and technical resources to citrus producers on pesticide use restrictions and facilitate communication with, and information from, UC Cooperative Extension on ACP management strategies, including an AWC program. CACs oversee licensed PCOs to ensure that pesticide use is properly reported.

CACs provide training and technical resources to citrus production nurseries statewide regarding the implementation of the federally approved insect- resistant screen house program, issue compliance agreements, conduct on-site inspections, procure plant samples, and monitor 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

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 AWC program for 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 AWC of ACP that was implemented because of the December 2008 meeting. The second TWG addressed questions covering insecticide applications, production practices, survey practices, and management areas. In general, the TWG summarized that AWC of ACP is achieved with effective communication and coordination of treatments among local citrus growers and grove managers. Coordinated treatments reduce the number of ACP from which an infestation can develop and is therefore a successful method for controlling overall ACP populations.

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.
- Complete coordinated area-wide treatment applications within a two to three-week time frame.
- Implement an insecticide Mode of Action that is coordinated and rotated within management areas to prevent development of insect resistance.
- Maintain reduction of ACP population through dormant season applications.
- Tailor the application method (aerial, ground) 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 encompass as much citrus acreage 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.
- Emphasize scouting for ACP in grove block perimeters. Tailor the scouting method(s) (sticky trap, visual, and stem tap) 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 are engaged to assist with education, communication, and public awareness in citrus growing states.

**Science and Technology**

Scientists with the USDA S & T are consulted on all program elements, including detection techniques, diagnostic tools, and exclusion policies. Scientists with S & T are typically included in the TWG. S & T 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. S & T also develops and validates new molecular diagnostic tools and provides diagnostician training.

**Agricultural Research Service**

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 CDFA. Scientists with ARS are typically included in the TWG. ARS scientists are actively engaged in the development of survey programs implemented in California. They are also engaged in research on early detecting technologies (EDT).

**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 growers' 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 and CPDPD.

The UC ANR also conducts research on HLB in the biosafety level 3 (BSL3) laboratory located at UC Davis. In September 2019, the California Citrus Research Foundation raised $8 million through donations by citrus growers and packers and partnered with UC Riverside to build a BSL3 laboratory near the UC Riverside campus. A BSL3 laboratory is required to conduct research and diagnostics involving dangerous plant and animal pathogens. Scientists at both BSL3 facilities are conducting research on HLB.

**Citrus Clonal Protection Program (CCPP)**

The CCPP is a cooperative program among the UC Riverside Department of Plant Pathology and Microbiology, CDFA, CPDPD, 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 CPDPD 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

The SAP is comprised of scientists from the UC, USDA, other states, and citrus industry experts. These scientists are tasked with answering scientific questions to inform policy makers on the best available science when developing eradication and control procedures and regulatory policies. The SAP has provided recommendations on the criteria used to determine if an ACP population exists in an area, and when an area can be declared free of ACP. The panel recommendation and full report are available on the program website.

### 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 answers health-related questions at CPDPD public meetings held prior to CPDPD pesticide applications.

### State Water Resources Control Board (SWRCB)

SWRCB issues National Pollutant Discharge Elimination System (NPDES) permits that identify measures needed to reduce or eliminate potential adverse impacts to surface water from pesticide ingredients. CDFA holds a NPDES General Permit issued by the titled “Statewide General National Pollutant Discharge Elimination System Permit for Biological and Residual Pesticide Discharges to the Waters of the United States from Spray Applications.” The United States Environmental Protection Agency and the SWRCB have classified this discharge as a minor discharge. The NPDES permit requires CDFA and CPDPD to comply with the federal Clean Water Act (CWA) (33 U.S.C. §1251 et seq.). The CWA is a law that establishes the 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 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 are present at CPDPD public meetings and available to engage with interested homeowners.

**United States Fish and Wildlife Service (USFWS)**

The mission of the USFWS 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. Their primary responsibility is management of migratory birds, endangered species, certain marine mammals, and freshwater and anadromous fish. The USFWS provides technical assistance to CDFA and CPDPD 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, as defined by the United Nations Convention on the Law of the Sea. 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 and CPDPD 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 and CPDPD on issues pertaining to the impact of program activities on State-listed threatened and endangered species and critical habitat.

**Industry Representatives**

Industry representatives 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 asked for their input on the practicality and feasibility of proposed policies and procedures.

**Citrus Research Board**

The CRB administers the California Citrus Research Program, the 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 plan for future threats to the economic production of citrus. The CRB partners with the CPDPD 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 *C*Las diagnostic analysis of ACP samples at the CRB's Jerry Dimitman Laboratory in Riverside, California.

**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 regulatory and legislative processes which may result in an economic impact to growers. Sunkist is a grower cooperative that works 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 CPDPD 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 Plant California Alliance, California

Citrus Nursery Society (CCNS), the California Citrus Nursery Board (CCNB), and the California Nursery Advisory Board (NAB). Plant California Alliance 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. NAB is a group appointed by the Secretary to advise CDFA on matters affecting and pertaining to nurseries in California.

NAB is comprised of representatives from a wide spectrum of the nursery industry. The mission of the NAB is to grow and maintain a strong relationship between CDFA and the nursery industry to secure the industry's future. All these entities work collaboratively with CPDPD 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. 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 CDFA may take summary abatement actions against "public nuisances" when it is part of an eradication regulation.

FAC sections 5762-5763 and 3 CCR section 3439 enable CDFA to take immediate, eradicative action against HLB in any area of the state where it may be found.

**Public and Stakeholder Notification**

The public and stakeholders are notified prior to the CPDPD engaging in program activities in their area. This is done by issuing a Proclamation of an Emergency Program (PEP) which provides notification of an emergency response area.

In addition to being published on CDFA website, PEP documents are distributed to all state and local elected officials who represent the affected area, including mayors, County Board 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 Agriculture
- County Agricultural Commissioner
- California Environmental Protection Agency

**Proclamation of Emergency**

A PEP is a communication tool used to inform the public and stakeholders of CPDPD's intended actions in areas where ACP, ACP positive for *C*Las and/or HLB trees infected with *C*Las have been detected. Issuing a PEP is not a requirement; however, CDFA's policy is to issue a PEP for all chemical treatment and host removal activities conducted by the CPDPD.

The PEP explains to interested parties that ACP, *C*Las-infected ACP and/or HLB-positive hosts have been detected and CDFA's intent to conduct delimitation surveillance and treatment, and/or host removal in a designated area. The PEP explains that the presence of these pests poses an emergency and can cause harm to the state's environment, public health, and economy if left unabated. The PEP details the detections which caused CDFA 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 program. 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. Residents in the impacted areas are notified in writing in advance of any treatment and/or tree removal in accordance with FAC sections 5771-5779 and 5421-5436.

## Public Information

Prior to undertaking any treatment activity for a property with ACP and/or hosts infected with HLB, CPDPD either contacts the affected residents directly or schedules a public meeting or series of public meetings to inform residents, growers, and other interested parties of CPDPD'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 public 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 FAC section 5779. 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 with 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 CDFA's toll-free Exotic Pest Hotline telephone number for assistance. If the resident refuses tree removal or is unavailable for contact, abatement letters and eventually a warrant for the removal of the tree may be issued.

Press releases are prepared by CDFA's Public Information Officer (PIO) and/or the CAC. Either the CAC or the PIO serve as the primary contact to the media. CDFA and CPDPD in cooperation with the CACs may participate in briefing and/or presentations with local elected officials.

## State Interior Quarantine Regulations

### Asian Citrus Psyllid

3 CCR 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 regulations. The area under quarantine was determined to be a 20-mile radius from the detection site. The radius was reduced 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, UC and the USDA released a briefing paper that indicates, beginning in June 2017, a sharp increase in HLB and *C*Las-positive ACP detections, cities containing HLB, and ACP nymphs. Following the release of the November 22, 2017 briefing paper, CDFA became aware of the prevalence of HLB, whereas 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.

3 CCR section 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. Compliance with these restrictions and prohibitions is achieved 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 XIII of this document.

### Huanglongbing

3 CCR section 3439 was promulgated in 2012 after the detection of HLB in Hacienda Heights in Los Angeles County. This regulation pertains to all HLB hosts and prohibits movement within and from affected areas. Compliance with this regulation, as with the ACP quarantine regulation, is achieved through education, outreach, and communication with establishments (primarily retail and production nurseries) in the affected area.

Under 3 CCR section 3439, the detection of a single HLB-infected tree triggers an HLB State Interior Quarantine. The HLB State Interior Quarantine regulation is 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 is visually surveyed for additional ACP and symptoms of HLB. Detection trapping and survey work includes:

- Trap Density: Five to 16 traps per square mile, dependent on commercial citrus in a county.
  - 10,000 or more acres – 16 traps per square mile.
  - 1,000-9,999 acres – nine traps per square mile.
  - Less than 999 acres – five traps per square mile.

- Trap Servicing Interval: Monthly.
- Trap Relocation and Replacement: Traps are relocated and replaced every four to eight weeks to another host with a minimum relocation distance of 500 feet.
- Visual surveys and/or tap sampling are conducted once at each trapping site when the trap is placed.

**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 the Generally Infested Area**

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

**Trapping**

ACP traps are placed at a density of 50 traps per square mile in a four-square mile delimitation area centered on the detection site. Traps are serviced weekly for one month. If no additional ACP are detected, the traps are serviced monthly for one year past the date the ACP was identified. Subsequent detections may increase the size of the delimitation survey area and restart the one-year duration on the trap servicing requirement.

**Visual Survey**

All detection sites and adjacent properties are 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 area-wide trapping program. These traps are deployed throughout the state in areas conducive to GWSS establishment. PDCP staff screen the traps for GWSS and then traps that were last placed in a citrus host are sent to an ACP screening facility. Traps containing suspect ACP are sent to CDFA's PPDC for confirmation.

### Commercial Grove Trapping

In counties with substantial commercial citrus production that are not generally infested with ACP, CPDPD places traps in commercial grove areas not already covered by the GWSS area-wide trapping program. CPDPD places these traps at the density of one trap per 40 acres. Traps are replaced monthly 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 *C*Las.

### County Notification of ACP/HLB Detections

The default method of county notification for ACP comes from the Citrus Division District Manager for the affected county, who acts as the liaison between the CPDPD and the county. The CPDPD is first notified of confirmations by the PPDC via communication plan emails. CPDPD headquarters then notifies the relevant Citrus Division District Manager and other permanent staff in that district regarding the confirmation. It is then relayed to the county. District staff, with guidance and oversight from CPDPD 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 CPDPD leadership. A subscription service is also in place via the Pest and Damage Record (PDR) reporting system that can provide notification directly to the county.

## VIII. Detection and Survey Activities for HLB

### Multi-Pest Survey

On October 1, 2021, the CDFA, at the direction of the USDA implemented a multiple pest survey as part of the CHRP agreement. Previously the CHRP agreement had been focused solely on ACP and HLB activities. The expanded survey includes diseases such as sweet orange scab (SOS), citrus canker (CC), citrus black spot (CBS), citrus variegated chlorosis (CVC), citrus leprosis (CL), citrus yellow vein clearing virus (CYVCV), and citrus yellow mosaic virus (CYMV). Field staff survey for all these pests and diseases during routine residential HLB risk-based surveys. However, the primary focus of this section is to document CPDPD's methodology for surveying of ACP and HLB.

The areas and number of sites surveyed, per square mile, were determined collaboratively by CDFA and USDA ARS. As the first step, high-risk areas for survey consideration were determined using the following factors:

- Census Travel
- ACP Density
- *C*Las+ ACP and Tree
- Major Citrus Transportation Corridor

- Swap Meets and Flea Markets
- Weather Suitability

CPDPD then finalizes the survey locations, prioritizing the identified high-risk areas, residential areas around commercial citrus groves, and disease-leading edge areas. Each survey location is mapped and identified by the section, township, range (STR) identification (ID) (the unique index). Each STR ID is assigned a Sample Density, shown in Table 2, based on the HLB risk and the number of citrus hosts in the STR.

Table 2. Example of Recommended Sampling Density and Number of Survey Sites for Citrus Pests and Diseases in California

| Recommended Sampling Density | Actual Number of Sites to Survey | Square Miles with the Recommended Density | Total Number 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 |

The number of surveys STRs and sample density in each STR are used to determine the number of sites to sample for each survey cycle. Data obtained from the survey is analyzed and provides input for subsequent survey cycle designs. Although the survey sites and sampling densities are primarily selected based on HLB risks, staff will inspect all host trees for symptoms of other citrus diseases.

The CPDPD's procedures for inspecting hosts at survey sites, collection, and submission of ACP samples for analysis, submission of plant samples for analysis, and resampling are described below.

**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 are identified.
    - Each host tree is visually sectioned into quadrants. Each quadrant is inspected for all ACP life stages (adults, nymphs, and eggs). Adults and nymphs are collected for analysis.
    - All hosts at the site are inspected for symptoms of HLB and other pests and diseases. The most common HLB symptom is the blotchy mottle on the leaves (which occurs on most host varieties). The symptoms are better

observed in the interior part of the canopy where the sun is less likely to obscure the symptoms.
  - Plant material is collected from all hosts displaying disease symptoms.
  - If HLB symptoms are not observed, but there is a high population of ACP on the host(s), plant material is collected from the tree(s) that have a high population of ACP.

**Collection and Submission of ACP Samples for Analysis**

- Adult ACP are collected with an aspirator. Using a pipette, ACP are transferred into a vial containing 95 percent non-denatured ethanol.
- Adult ACP from different hosts on the same property may be pooled into one vial (one vial per site, up to 25 adult ACP per vial).
- New growth is inspected for ACP nymphs. Nymphs are collected with a small paint brush or forceps and placed in a vial with 95 percent non- denatured ethanol. Nymphs from different hosts are placed in separate vials for each host (up to 75 nymphs per vial).
  - Adult ACP and nymphs are placed in separate vials. However, only one PDR (Entomology) is used per site.
  - Vials are numbered, beginning with number 1. Field notes are recorded to 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, 3 adult ACP from tree #5= mandarin.
- Host information is entered into the host section of the PDR.
- A PDR sticker is affixed to each vial. All vials with PDR stickers and a printed copy of the PDR are placed in a plastic bag.
- Samples collected outside of the generally infested area (counties north of Santa Barbara County and the Tehachapi Mountains) are placed in a cooler with ice packs and sent to CDFA PPDC and analyzed per the appropriate protocol for entomological analysis and *C*Las using Real-time Polymerase Chain Reaction (qPCR) analysis.
- Samples within a generally infested area with commercial citrus production are placed in a cooler with ice packs. The cooler is sent to CRB, Jerry Dimitman Laboratory in Riverside, California where laboratory staff confirm that the contents of the cooler are accurately reflected on the chain of custody. The samples are then analyzed for *C*Las per the appropriate protocol.

### Submission of Plant Parts for *C*Las Analysis

- Leaf samples are only collected from trees exhibiting HLB symptoms or where ACP have been collected. Twenty leaves (preferably symptomatic) are collected per tree, five leaves from each quadrant of the tree.
- Clippers, if used, are disinfected with 70 percent non-denatured ethanol after every sample collection.
- Thorns are removed. Leaves are cleaned with a paint brush to remove any debris, including any ACP life stages present and any other insects. Leaves are given a final inspection to ensure that the sample is free of all insects.
- Each plant sample is wrapped in a paper towel and placed in a sealable plastic bag.
- Using a permanent marker, each bag is labeled with the host tag number and the host type. A PDR barcode sticker is affixed inside the bag, at the top right corner, with the PDR barcode number clearly visible or the PDR number is written directly on the bag. When multiple hosts are sampled at a single property, the individual bags are placed inside a larger sealable plastic bag and submitted with one copy of the designated PDR form.
- One PDR form for Plant Pathology Lab is completed for each site. Tree(s) from each site are numbered. If the detection site has multiple trees, one PDR with multiple samples is created. Samples from one site are submitted with one copy of the PDR form.
- In the “Remarks” section, information on the host from which the sample was taken is recorded. Examples:
  - T #1 = lemon;
  - T #2 = grapefruit; and
  - T #3 = Mexican lime.
- Host information is entered in the host section of the PDR.
- Sample bags are placed in a cooler with ice packs. A paper towel is placed between the ice packs and the samples to ensure that the samples stay dry but cool. Samples collected from CPDPD’s Northern District are hand-delivered to the PPDC, whereas samples collected from CPDPD’s Southern and Central districts are shipped to the PPDC. Upon receipt, samples are sorted, reconciled with the PDRs (or other chain of custody forms), and accessioned by the PPDC Lab prior to testing.

### Resampling Properties

Properties that previously had either an HLB positive tree or *C*Las positive ACP sample, properties adjacent to positive properties, and properties that had samples that were inconclusive are intensively resampled by CPDPD. CPDPD correlates the number of times they have been on these properties and how many inconclusive samples were on that property. Trees on these properties are sampled using the quadrant sampling method, with six to eight peduncles collected (stems are permissible if peduncles are not present) from each of the four quadrants of the tree,

one twenty leaf sample, and one root sample, for a total of six separate samples per tree (four peduncle, one leaf, and one root).

## IX. Treatment Activities

### Treatment

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

Factors CPDPD considers prior to treatment include:

- Determination if suppression of ACP is feasible.
- The proximity of the ACP infestation to commercial citrus.
- The level of HLB risk; and
- Consistency with the overall goal of protecting the state's commercial citrus production.

Scenarios throughout the state in which treatment occurs:

- In areas where HLB is detected, CPDPD conducts residential treatments to suppress ACP populations.
- In areas where ACP has not been previously detected, or where ACP has been detected at low densities, CPDPD conducts residential treatments in response to ACP detections to prevent ACP establishment or suppress populations.

### Outside of the Generally Infested Area

CPDPD'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 orchards.

### Treatment Protocols

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

In general, when treatment has been deemed appropriate, CPDPD applies insecticides to host trees in the residential (urban) areas in a 50 to 400-meter radius around each detection site. Only ACP host plants are treated.

The actions below are an emergency response to the detection of one or more ACP, whether collected live or in a trap, in counties north of Santa Barbara County and the Tehachapi Mountains.

- Detection of one ACP at one site - All properties with hosts within a 50-meter radius of the detection site are treated. A subsequent detection of one or more ACP within 400 meters will result in all properties with hosts within 400 meters of the detection site(s) being treated.
- Detection of two or more ACP at one site - All properties with hosts within a 400-meter radius of the detection site are treated.
- A PEP is issued.
- A public meeting is held as needed.

**In Response to an HLB Detection**

- ACP hosts on all properties within a 250-meter radius of the detection site are treated in response to the emergency.
- A PEP is issued for HLB positive tree detections and for *C*Las positive ACP detections.
- A public meeting is held as needed.

**Treatment Methodology**

The treatment protocol consists of both a foliar and a systemic insecticide. Foliar insecticide is used for immediate reduction of the adult population to prevent the adults from dispersing. 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 end no later than two years after the last psyllid detection in the treatment area.

CPDPD 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 (Bayer) (beta-cyfluthrin) is a pyrethroid contact insecticide. Treatment initially occurs once, and subsequent applications may occur up to four times annually if additional psyllids are detected. This material is applied to the foliage of all host plants using hydraulic spray or hand spray equipment.

**Soil Treatment**

A systemic soil application is made using either Merit® 2F (Bayer) or CoreTect™ (Bayer).

- Merit® 2F (imidacloprid), is a neonicotinoid systemic insecticide. Treatment initially occurs once, and a subsequent application may occur once on an

annual basis if additional psyllids are detected. This material is 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. It is also used to treat hosts that are in outdoor planting pots. Treatment initially occurs 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 within the root zone of host plants.

**Termination of Treatment**

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

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

**Actions to Replace Treatment**

The following actions are implemented in areas where treatment has been terminated:

- Trapping at the rate of 25 traps per square mile in all delimitation areas continues, until such time that ACP can be easily collected without a trap find to locate a population.
- Visual survey is 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 is tested for HLB.
- ACP biocontrol agents are released as appropriate or available.
- The detection of HLB triggers the HLB protocol.

**Environmental Consultation**

The treatment area is reviewed through consultation with the CDFW's Natural Diversity Database for threatened or endangered species. CPDPD also consults with the CDFW, USFWS, and NMFS when rare and endangered species are located within the treatment area. Mitigation measures are implemented as needed. CPDPD does not apply pesticides to bodies of water or undeveloped areas of native vegetation. All treatment is 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 CPDPD contracts with CDPR to oversee environmental monitoring of treatment projects. Sampling media includes air, leaf, soil, tank, and water. To address human health issues, CPDPD has contracted with OEHHA.

### Pollinator Protection

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 make every effort to ensure 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

The CDFA's PPDC Plant Pathology Laboratory is USDA NPPLAP accredited to provide the following services:

1. High-throughput testing of plant samples for the presence of *C*Las using two USDA-validated multiplex TaqMan Real-time Polymerase Chain Reaction (qPCR) tests:
   - *C*Las specific Ribonucleotide Reductase (RNR) gene-based qPCR assay multiplexed with the plant cytochrome oxidase (COX) gene ampliset as an internal positive control (Zheng et al. 2016) is used for screening samples.
   - *C*Las specific 16S rDNA-based qPCR test multiplexed with the plant COX gene probe/primer set as a positive internal control (Li et al., 2006) is conducted in addition to the RNR qPCR assay, are used for retesting samples that produce a signal with the initial screening test. If further confirmation is needed, a conventional PCR test is used to amplify a fragment of the β-operon gene specific to *C*Las for sequence analysis (Hocquellet et al. 1999).
2. Testing ACP samples for the presence of *C*Las using two USDA validated qPCR assays:
   - *C*Las specific 16S rDNA-based qPCR test multiplexed with the psyllid specification glycoprotein (WG) gene-based ampliset as an internal positive control (Li et al., 2008) is used for screening ACP samples.

- *C*Las specific RNR qPCR and the 16S rDNA-based qPCR tests multiplexed with the WG internal positive control are used for retesting ACP samples that produced a signal with the initial screening test.

3. Testing samples for *C*Las submitted by pest prevention programs including state, county, and federal agencies, as well as academic and public sources.
4. Testing samples submitted by individual farmers, PCA, UC cooperative extension agents, nurserymen, arborists, homeowners, government municipalities, educational institutions, and others.
5. Collaborating and sharing data with researchers to continuously improve HLB surveys and detection assays.
6. Providing *C*Las positive source material such as infected budwood, lyophilized tissue, and DNA to UC and USDA researchers.
7. Maintaining a collection of California *C*Las isolates in lyophilized plant tissue stored in -80°C Ultra-low freezer.
8. Inspecting and administering HLB proficiency testing to permit private and grower-funded laboratories in California to test non-regulatory samples for HLB.

CDFA's PPDC Entomology Laboratory services include:

1. Insect identification services for CDFA's pest prevention programs, other government agencies, and the public, are conducted 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 Plant Pathology Laboratory is NPPLAP accredited to conduct qPCR analysis of plant and insect samples for *C*Las using the USDA validated protocols described above. UA may be contracted by CDFA to analyze ACP samples for *C*Las.

**Citrus Research Board, Jerry Dimitman Laboratory**

The CRB Jerry Dimitman Laboratory in Riverside, California is NPPLAP accredited to conduct qPCR analysis of plant and insect samples for the presence of *C*Las. The CRB's laboratory is contracted by CDFA to test plant and ACP samples for *C*Las using the USDA-validated protocols described above. Thousands of ACP samples are redirected to the CRB's laboratory for *C*Las testing annually.

**Citrus Pest Detection Program (CPDP)**

The CPDP laboratory, operated by the Central California Tristeza Eradication Agency, is permitted by CDFA to test non-regulatory samples for the presence of *C*Las using the USDA validated protocol described above. The CPDP laboratory may be contracted by CDFA to screen samples of ACP for the *C*Las bacterium.

## XI. HLB Response Activities

Because HLB is the most devastating disease of citrus worldwide, California cannot afford to allow the spread of HLB through the 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:

- Abatement procedures to remove infected trees.
  - 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.
- ACP controls to prevent the spread of *C*Las.
- Replanting with disease-free trees, which necessitates that all citrus nursery stock be produced under protective structures.

Each instance is evaluated on a case-by-case basis, as described in the following section.

### Residential Property Response

#### Host Plant Tests Positive for HLB-associated Liberibacter - Mandatory

- Upon confirmation of an HLB infected citrus tree or host plant, Tempo® SC Ultra is applied to the infected plant.
- After treatment has dried and following the restricted-entry interval (REI) indicated on the label, the infected tree or host plant is removed and destroyed per the abatement procedures. The stump is completely removed by mechanical means.
- Delimitation is initiated following the standard 250-meter radius delimitation survey protocols.
  - All host plants are surveyed, and tissue samples are collected from all host plants.
  - All host plants are examined for evidence or presence of ACP and all specimens found are collected.
  - All plant and ACP samples are sent to a NPPLAP accredited laboratory for analysis for HLB-associated bacteria.
- A 250-meter treatment is initiated, both foliar and systemic insecticides are applied to all host plants in the treatment area.
- If the detection is in an area not quarantined for HLB, a five-mile radius quarantine is established with CAC concurrence. If an HLB quarantine already exists but does not include all areas within the five-mile radius, the existing quarantine is expanded.
- All host plants remaining on the property are placed on hold.

- All trace back information is collected on the source of the diseased plant if available.

**ACP Tests Positive for HLB-associated Liberibacter – Voluntary**

- If an inoculative adult ACP is found feeding on a host plant, the plant on which the insect was found feeding is considered "highly" suspect for HLB and routinely monitored.
- If an inoculative ACP nymph is found on a host plant, CPDPD treats and removes the host plant, citing FAC section 5762, which states, in relevant part, "[a]ny 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 *C*Las positive ACP nymph can only acquire the bacteria via feeding on a *C*Las-positive tree or transovarial transmission (acquisition from the mother to the egg).
  - Studies suggest any *C*Las infected ACP nymph is 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."
- Delimitation is initiated following the standard 250-meter radius delimitation survey protocols.
  - All host plants are surveyed, and tissue samples are collected from all host plants.
  - All host plants are examined for evidence or presence of ACP and all specimens found are collected.
  - All ACP samples are sent to a NPPLAP accredited laboratory for analysis for HLB-associated bacteria.
- A 250-meter treatment is initiated, both foliar and systemic insecticides are applied to all host plants in the treatment area.
- A *C*Las-positive ACP does **not** trigger a quarantine.

**Commercial Grove Response**

Grove definition: contiguous citrus with edges defined as spacing between plantings larger than a wind machine row, one acre or more of trees (100 trees per acre) and being grown with the intent of harvesting the fruit for sale.

**Host Plant Tests Positive for HLB-associated Liberibacter – Mandatory**

- Upon confirmation of an HLB-infected citrus tree, CPDPD notifies 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 UC Integrated Pest Management (IPM) website.

- After the REI on the label, the grower must remove and destroy the diseased citrus tree per the abatement procedures. CPDPD verifies removal within 48 hours of the REI. If the tree has not been removed, CPDPD removes the tree and charges 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 is completely removed. Monitor for suckers or resprouts, as they are very attractive to ACP. If suckers or resprouts are found, the grower is directed to remove them.
- CPDPD initiates a survey of all citrus trees on the perimeter (all end rows/trees in all directions) of the affected grove and all groves within 250 meters.
    - All host plants are surveyed, and tissue samples are collected from all host plants.
    - All host plants are examined for evidence or presence of ACP and all specimens found are collected.
    - All ACP samples are sent to a NPPLAP accredited laboratory for analysis for HLB-associated bacteria.

  Note: If any portion of a site ID is intersected by the 250-meter radius, the entire grove associated with the site ID is included in the survey area. If no site ID is associated with the grove, the entire parcel will be included in the survey area.

- CPDPD initiates a 250-meter treatment protocol. CPDPD communicates to growers who are in the 250-meter treatment area. Treatment will be completed using one or two UC-approved insecticide treatments for bulk citrus from the list posted on the UC IPM website to all host plants within 250 meters of an HLB positive citrus tree or host plant. One foliar treatment is required if the grower has been participating in an area-wide treatment program. Two treatments are required if the grower has not been participating in an area-wide treatment program. The first treatment is a foliar application. If the grower chooses not to comply with the first foliar treatment within seven days, then CPDPD applies the insecticide and charges the expense to the grower. If the second treatment is a foliar application, then it is applied 30-60 days after the first treatment. If the second treatment is systemic, then it is applied within two weeks of the first treatment.

  Note: If any portion of a site ID is intersected by the 250-meter radius, the entire grove associated with the site ID is included in the treatment area. If no site ID is associated with the grove, the entire parcel will be included in the treatment area.

- If the detection is in an area not quarantined for HLB, a quarantine is established 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, the existing quarantine expands the existing quarantine.
- All host plants remaining on the property are placed on hold.

- Trace back information on the source of the diseased plant should be collected, if available.
- The perimeter of all groves within 250 meters of a *C*Las-positive detection should be resampled once a year with a direct testing method.

**ACP Tests Positive for HLB-associated Liberibacter – Voluntary**

- If the inoculative ACP adult is found feeding on a citrus tree, the plant on which the insect was found feeding is considered "highly" suspect for HLB and routinely monitored.
- If an inoculative ACP nymph is found on a citrus tree, CPDPD asks the grove owner to treat and remove the tree (following the same procedures for an HLB positive tree), pursuant to FAC section 5762, which states, in relevant part, "[a]ny 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, CPDPD may treat and remove the tree per FAC Section 5762 and charge the grower for the cost of removal activities.
- A *C*Las-positive ACP nymph can only acquire the bacteria via feeding on a *C*Las-positive tree or transovarial transmission (acquisition from the mother to the egg).
- Studies suggest any *C*Las infected ACP nymph is 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."
- CPDPD initiates survey of all host plants on the perimeter (all end rows/trees in all directions) of all groves within 250 meters of the detection.
  - All host plants are surveyed, and tissue samples are collected from all host plants.
  - All host plants are examined for evidence or presence of ACP and all specimens found are collected.
  - All ACP samples are sent to a NPPLAP accredited laboratory for analysis for HLB-associated bacteria.

  Note: If any portion of a site ID is intersected by the 250-meter radius, the entire grove associated with the site ID is included in the survey area. If no site ID is associated with the grove, the entire parcel will be included in the survey area.

- CPDPD initiates a 250-meter treatment protocol. CPDPD communicates to growers who are in the 250-meter treatment area. Treatment activities will be conducted in accordance with the UC IPM recommendations. The grower is asked to apply one or two insecticides based on UC recommendations to all host plants within 250 meters of a *C*Las positive ACP. One foliar treatment is suggested if the grower has been participating in an area-wide treatment program. Two treatments are suggested if the grower has not been

participating in an area-wide treatment program. The first treatment is a foliar application. If the second treatment is foliar, then it is applied 30 to 60 days after the first treatment. If the second treatment is a systemic insecticide, then it is applied within two weeks of the first treatment.

Note: If any portion of a site ID is intersected by the 250-meter radius, the entire grove associated with the site ID is included in the treatment area. If no site ID is associated with the grove, the entire parcel will be included in the treatment area.

- A *C*Las-positive ACP does not trigger a quarantine.
- CPDPD resamples the perimeter of all groves within 250 meters of *C*Las-positive ACP detections once a year with a direct testing method.

**Nursery Response**

**Host Plant Tests Positive for HLB-associated Liberibacter – Mandatory**

- Upon confirmation of an HLB infected citrus tree (or host plant), CPDPD notifies the nursery and places all host plants at the nursery on hold. The detection triggers survey and testing of host plants within 250 meters of the find site.
- If the detection is in an area not quarantined for HLB, a five-mile radius quarantine is established with CAC concurrence. If an HLB quarantine already exists but does not include all areas within the five-mile radius, the existing quarantine is expanded.
- During the quarantine approval and implementation process, CPDPD staff may use CDFA's 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 CPDPD 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, planting the trees on the same or adjacent property to be farmed commercially, or voluntarily destroying the plants. Nurseries are required to contact CPDPD with their decision and are then given further instructions.
- If HLB is detected within a CDFA-approved insect resistant structure, all host nursery stock within the structure may be destroyed.
- Host nursery stock within the HLB quarantine that has been grown and maintained within an APHIS-approved exclusionary facility is 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 are treated accordingly.
- 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

- Upon confirmation of a *C*Las infected ACP in a nursery, CPDPD may place host plants within the nursery on hold until plant samples are taken and tested.
- All nurseries within 250 meters of the detection are notified of the detection and treatment. CPDPD communicates to nurseries that are in a 250-meter treatment area. The nursery is asked to treat all exposed nursery stock using CDFA approved insecticides.
- A *C*Las-positive ACP does **not** trigger a quarantine.

## XII. Biological Control Activities

Complementing CPDPD'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. A classical biological control program uses natural enemies from a pest's historic location of origin to manage the pest in its introduced area. The goal of this program is to significantly reduce the abundance of ACP in urban areas to slow the outward spread of this pest, and consequently the disease it carries into commercial citrus production.

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

Two potential ACP biocontrol agents (parasitic wasps *Tamarixia radiata* and *Diaphorencyrtus aligarhensis*) have been identified and collected from climatically matched areas of Pakistan by UC Riverside researchers. 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 produced or released.

The 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* were developed in Florida and Texas and have been adapted for use in California.
- Maintaining a genetically variable parent population of *T. radiata* is accomplished by rearing individual lines of the parasitoid in isolation, each line having been collected at a different location and / or time, initially from the

native range of ACP but now from established populations throughout California. Offspring from these lines are interbred and their offspring are used as parents for mass-rearing and field cage production. Maintenance of isolated parasitoid populations prevents loss of genetic variability, adaptation to laboratory conditions, and loss of attributes that are necessary for effective biological control in the field. This work was being carried out at the CDFA/CRB facilities in Riverside.

- Mt. Rubidoux and CSU Pomona insectaries. Production of curry leaf plants is at CDFA's Arvin facility (Kern County). This plant is a preferred host for ACP and has the added benefit that it is not a host for HLB. This ensures that all ACP used in the production process are disease-free. Both host plant and ACP colonies are routinely tested for HLB as an additional safety measure.
- Production of *T. radiata* on caged, field trees at CSU Pomona and in 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 caged 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 90 out of 100 monitoring 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 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 of *T. radiata* in areas surrounding HLB eradication areas to target diseased ACP. CPDPD provided *T. radiata* to the USDA's International Services for release in Mexico through June 2020 and continues to provide *T. radiata* for release in Arizona and *T. radiata* and ACP for use in research projects. Over 29 million *T. radiata* have been released in California to suppress ACP in urban areas since 2011; releases have been made in over 26,000 locations over the past five years.

## XIII. Regulatory Activities

### General

CDFA regulates the intrastate movement of ACP and HLB host material pursuant to 3 CCR section 3435, Asian Citrus Psyllid State Interior Quarantine and section 3439,

Huanglongbing Disease State Interior Quarantine. The USDA regulates the interstate movement of ACP and HLB host material pursuant to the Code of Federal Regulations (CFR), title 7, section 301.76, for Citrus Greening and ACP. These regulations establish the quarantine areas, hosts and possible carriers of the pest and disease, and the prohibitions or conditions which enable movement of hosts within or from the quarantine area.

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

CDFA conducts regulatory activities and enforces regulations to prevent the artificial spread of ACP and HLB by restricting the movement of host material from an infested area. Regulatory activities include creating and issuing compliance agreements, publishing Citrus Division and Phytosanitary Advisories to provide detailed information on regulations and enforcement policies, developing and sharing educational material, and consistently communicating with and inspecting regulated establishments to ensure compliance with the regulations.

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 3 CCR section 3701, Citrus Nursery Stock Pest Cleanliness Program (NSPCP). All source trees for citrus nursery stock propagative materials are registered with the Citrus NSPCP and must meet testing and maintenance requirements.

**ACP Regional Quarantine**

On January 1, 2018, 3 CCR section 3435 was amended to reflect a regional quarantine structure based on pest risk criteria to regulate host nursery stock and bulk citrus. CDFA created and may modify the regional quarantine zones as appropriate in accordance with the pest risk criteria. Notification of all quarantine changes will be sent to those signed up to receive updates and will include a map of the amended quarantine zone and a written description of the boundaries. The regulation amendment also established an appeal process for interested parties to challenge quarantine zone designations.

In addition to the regional quarantine zone structure, the ACP regulation also establishes regulated articles and commodities, restrictions of movement of the articles and commodities, and exemptions to the regulation. 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 life stages of ACP prior to movement out of the HLB quarantine area.

**Compliance Agreements**

Compliance agreements convey the quarantine restrictions and requirements to affected businesses located within a regulated area. Under the authority provided in FAC section 5705, CDFA issues compliance agreements to all citrus growers, transporters, packers, fruit sellers, and wholesale nurseries. Under a signed compliance agreement, regulated establishments are permitted to move host material while adhering to the terms of the agreement and with general CPDPD oversight. While the signed agreements are self-executing, CPDPD conducts periodic inspections to ensure quarantine compliance.

**Safeguarding 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 prevents any loss of fruit, leaves, stems, branches, or plant debris while in transit. The safeguards are secured prior to the vehicle departing with fruit and must remain in place until the vehicle reaches its destination for offloading.

**Hold Notices**

Under FAC sections 5701-5704, CDFA may issue a hold notice to prevent the movement of ACP and HLB hosts from a property. Hold notices may be issued for several reasons including the detection of ACP or HLB or quarantine non-compliance and may be issued for all ACP or HLB hosts on any premise up to five miles from a detection site.

**Special Permits**

Under authority provided in 3 CCR section 3154, the Secretary may issue special permits pertaining to the movement of regulated articles and commodities which would otherwise be prohibited by regulation. This may occur when there is a specific demonstrated need, and the terms and conditions of the permit adequately mitigate the biological risk of spreading a pest. These special permits are called Quarantine Commodity (QC) permits and may be issued to individuals, businesses, researchers, or to CDFA program staff. The permit may be self-executed with all the terms and conditions listed in the permit or may require the permit participants to enter into compliance agreements. QC permits have been issued for the movement of nursery stock and propagative material, bulk citrus fruit, mandarins with attached stems and leaves, leaves for consumption, green waste, and the removal of HLB suspect trees for research.

Additionally, special permits are issued by the state and federal government to support research activities related to ACP and HLB. State permits are required for the intrastate movement and use of such organisms and their hosts. Federal permits

are issued to researchers for the interstate movement of regulated organisms. For example, a federal permit was issued for the movement of 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. This activity now takes place under the terms of a state permit. State plant pest permits are also issued to researchers to maintain ACP infested nursery stock to determine the efficacy of conventional and organic pesticides in California.

The ACP quarantine regulation requires all host nursery stock to be treated and tagged and may only be moved within a nursery regional quarantine zone. The regulation also prohibits all commercial bulk citrus from being moved from the grove of origin. However, the following QC permits have been issued to CDFA to allow establishments to move ACP regulated material intrastate in an approved manner that would otherwise be prohibited by the regulation:

- QC 1289 – Movement of green waste from an ACP, HLB, or sweet orange scab (SOS) quarantine area. ACP, HLB, and SOS can be spread on host green waste and can therefore be transported to an approved transfer station, landfill, or compost or cogeneration facility.
- QC 1353 – Movement of ACP host nursery stock from a USDA-approved screenhouse to another nursery regional quarantine zone. All host nursery stock is treated but may be shipped without quarantine tree tags if shipped to Zone 1.
- QC 1359 – Movement of ACP host budwood without leaves and cuttings with leaves from a USDA-approved screenhouse. Cuttings with leaves are treated with an approved insecticide but budwood is not. Quarantine tree tags are not required to be affixed to material moved under this permit.
- QC 1378 – Movement of ACP host trees for direct farm planting without prior treatment or tagging. Untreated and untagged nursery stock originating from within a USDA/APHIS approved structure may move intrastate if destined for direct planting within a different ACP or HLB quarantine zone.
- QC 1380 – Movement of outdoor grown ACP host nursery stock from ACP Nursery Regional Quarantine Zone 2 to Zone 3. Nursery stocks are treated and tagged with the appropriate quarantine tree tag but may be shipped from Zone 2 to Zone 3.
- QC 1386 – Movement of mandarin fruit with attached stems and leaves. To be exempt from regulation, citrus fruit must be commercially cleaned and free from stems and leaves. QC 1386 allows mandarins with attached stems and leaves to be grown, transported, and commercially packed.
- QC 1411 – Movement of makrut lime, curry, and bael leaves within or from a regional quarantine zone. Host leaves for consumption must be washed, dried, frozen, or fumigated, and packaged to eliminate any life stages of ACP.

- QC 1431 – Movement of ACP host nursery stock from a USDA-approved screenhouse to another USDA-approved screenhouse or production nursery with treatment but without quarantine tree tags.
- QC 1464 – Movement of bulk citrus fruit within or from a bulk citrus regional quarantine zone. All establishments that grow, pack, and transport bulk citrus fruit must sign a compliance agreement prior to engaging in this activity. Fruit must always be transported fully safeguarded from exposure to ACP. Any establishment shipping citrus fruit to a different bulk citrus regional quarantine zone must first meet the ACP-free performance standard by applying a preharvest pesticide treatment or cleaning the fruit with a field cleaning machine.

**Voluntary Pre-shipment Nursery Treatment Program**

All nursery stock offered for sale in ACP Nursery Regional Quarantine Zones 2 or 3 is treated prior to movement within the zone. However, many retail sale locations are unable to treat plants on-site due to pesticide use restrictions, or other factors such as cost or space limitations. Therefore, CDFA and CPDPD developed a voluntary, pre-shipment treatment program for production nurseries located in ACP Nursery Regional Quarantine Zone 1 (non-infested zone). This program 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 host material and ACP host nursery stock. Under permit(s) issued by USDA, entities in California may ship these commodities interstate and must also sign a compliance agreement with CDFA. Shipments from a USDA-approved structure may be shipped to a citrus producing or non-citrus producing state, subject to local restrictions. Shipments of commodities maintained outdoors may only be shipped to non-citrus producing states under a limited permit issued by USDA, in addition to the compliance agreement.

**ACP Quarantine Enforcement**

In cooperation with USDA and the CACs, CDFA enforces the quarantine requirements to help ensure ACP is not artificially spread throughout the state. Enforcement activities include conducting inspections at nurseries, monitoring regulatory pesticide treatments, checking treatment and sales records, and inspecting citrus fruit growers, packers, transporters, and fruit sellers.

Quarantine enforcement activities also include responding to ACP detections in new counties. Using the pest risk criteria established in the regulation, CDFA, with approval from the affected CAC, will modify the regional quarantine zones as appropriate. Compliance agreements are signed with all regulated establishments to ensure quarantine requirements are met.

**HLB Detections**

Following each confirmed HLB detection, CDFA will issue a hold notice for all HLB host material on the property where HLB was found. All host material on the property is considered compromised and placed on hold to prevent the potential further spread of the disease.

**HLB Quarantine**

Pursuant to 3 CCR section 3439, CDFA will establish a quarantine area with a five-mile radius from each HLB positive tree detection. Quarantine borders will follow physical boundaries such as roads, rivers, or railways. All establishments growing, transporting, selling, or packing HLB host material within the established HLB quarantine area are regulated under a signed compliance agreement.

HLB host nursery stock, propagative plant parts (except seed extracted from fruit), and fruit are prohibited from moving out of the HLB quarantine area unless they meet the requirements outlined in 7 CFR section 301.76.

**Nurseries within the HLB Quarantine**

HLB host nursery stock is prohibited from moving within the area under quarantine unless produced and continuously maintained in a CDFA-approved screenhouse. When an HLB quarantine area is established, CDFA will issue a hold notice on HLB host nursery stock to each nursery within the quarantine area. Each nursery will then be issued a letter providing the option to construct a CDFA-approved screenhouse and house the plants within the screenhouse for a minimum of two years with regular HLB testing. Nurseries that implement this option will have the ability to sell HLB host nursery stock from the screenhouse to customers within the contiguous HLB quarantine area provided the two-year hold period with negative testing has been completed.

3 CCR section 3439 specifies the procedures and actions that CDFA must take in the event of a structural breach or a detection of ACP or HLB within the structure. Under this authority, a nursery may reduce the potential regulatory consequences if there is compartmentalization of the growing areas. Further, this section prohibits the nursery from moving nursery stock out of the facility in which a detection or breach is confirmed. CDFA will conduct a risk-assessment and will pursue mitigation measures appropriate to the circumstances on a case-by-case basis. For example, CDFA may require the nursery to treat all plants within the structure according to an established treatment schedule and repair the structural problems if any.

### Special Permits

Under 3 CCR section 3154, the following QC permits have been issued to CDFA to allow establishments to move HLB regulated material intrastate in an approved manner that would otherwise be prohibited by the regulation:

- QC 1289 – Movement of green waste from an ACP, HLB, or SOS quarantine area. ACP, HLB, and SOS can be spread on host green waste and can therefore be transported to an approved transfer station, landfill, or compost or cogeneration facility.
- QC 1342 and 1429 – Movement of ACP and HLB host material from and within HLB quarantine area for destruction (1342), and the ability to hold the host material prior to disposal.
- QC 1480 – Movement of bulk citrus fruit within or from an HLB quarantine area. All citrus fruit must be completely safeguarded from exposure to ACP in transit. Additionally, the establishment must meet the HLB pest risk mitigation standard prior to shipping fruit to a packinghouse or processor.
- QC 1503 – Movement of mandarin fruit with attached stems and leaves into an HLB quarantine area for retail sale. Mandarins with attached stems and leaves are packed by a packinghouse under compliance with QC 1386 and safeguarded the entire time within the HLB quarantine area.
- QC 1543 – Movement of bulk citrus fruit from any ACP Bulk Citrus Regional Quarantine Zone into an HLB quarantine area for packing or processing without meeting the ACP-free performance standard.

## XIV. Outreach and Education Program

The CPDPD engages the services of a professional outreach contractor to oversee a statewide outreach and education program. The program is designed to conduct concise and focused outreach to various audiences, including homeowners, citrus industry members and elected officials, about the threat that HLB and its vector ACP pose to residential and commercial citrus trees. Additionally, the contractor keeps growers abreast of the status of HLB and ACP, as well as other citrus pests and diseases. The outreach and education program includes, but is not limited to, 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, industry members, legislators, and stakeholders.
- Cohesive, distinctive artwork and graphics to be used on all printed and electronic materials associated with the CPDPD and CPDPC outreach and education program.
- Quarterly newsletters and articles distributed in existing publications, i.e., *Citrograph*, regional associations, trade press, on the CDFA's and CPDPC's websites, and via postal 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 CPDPP.
- A program that provides regular updates to regional citrus growers, CACs and Farm Bureau chapters, and that provides materials and information for use in local grower meetings, field day activities and trade shows.
- A program to identify candidates among California's citrus growers for education and deployment as local experts available or media interviews and public meetings in areas, such as their local communities, where citrus trees are newly infested with ACP or infected with HLB.
- Speaker kits, including talking points, handouts, and visuals, for use in providing presentations on ACP and HLB.
- A media outreach strategy that can reach reporters with breaking news in a timely fashion.
- Social medial outreach (X {formerly known as Twitter}, Facebook, etc.), upon approval of the CPDPD and CDFA.
- Provide program's outreach materials in multiple languages for distribution via multiple media channels to reach the largest audience.
- Paid media advertising strategies in key regions, including paid placements of a public service announcement and/or other advertisements.
- A program that participates in select public events in areas where support of treatment is critical.
- Ongoing management and programming of the existing homeowner (https://californiacitrusthreat.org/) and industry (https://citrusinsider.org/) websites.
- Working collaboratively with the regional Grower Liaisons to support outreach and develop a campaign to encourage grower participation in the area-wide treatment program.
- Supporting industry outreach if/when HLB arises or regulatory changes take place, or in other situations requiring immediate, focused attention on growers, packinghouses, field workers, haulers, pesticide applicators, etc.
- A program that provides ongoing educational information and resources to elected officials and local governmental groups, so they are informed on the issue and can share program messaging with their constituents.
- Building and reinforcing relationships with CACs, city officials and their staff for long-term partnership in combating ACP and HLB in their districts and counties, through engagement at conferences, city council meetings, and relevant trade associations elected officials are members of.
- An outreach plan to connect with elected officials in areas where there is a need to remove abandoned groves and/or a need for homeowner associations, and city- and county-owned properties to adequately treat citrus trees, including potentially participating in area-wide management.

### Residential Messaging

When conducting outreach to residential homeowners throughout the state, messaging is tailored to reflect the specific behaviors the CPDPD is seeking of residents with a citrus tree on their private property. In areas that are generally infested with ACP, messaging is focused on finding and eradicating HLB-infected trees and promoting proper tree care. In areas where ACP are not found in large numbers, residents are encouraged to inspect their trees for signs of the pest or disease. In all areas, public messaging emphasizes residents' cooperation with CPDPD survey and treatment crews.

### 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 program's outreach materials are distributed in various ways, including by the contractor, CDFA, CPDPD, and Grower Liaisons. 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 CPDPD periodically receives requests to facilitate research and is willing to participate if feasible. If a research opportunity arises, the CPDPD requests a one-page concept proposal from the requestor. The proposal shall include a brief background of the research, the name of the principal 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 will be used, and the final disposition of the samples. The anticipated area for the project, how many research staff are in the field, and the frequency of the visits must also be described. Additionally, the proposal shall include the funding source, and if the research project is a new or existing project. Proposals are reviewed for scientific validity and to assess impacts to the CPDPD's ACP/HLB response program.

**Early Detection Technology**

The CPDPD solely relies on USDA's work instruction for the validated PCR analysis to identify and confirm *C*Las positive ACP and HLB positive trees. Currently, EDT is not validated, and positives discovered from EDT are treated as suspect and experimental positives, pending confirmation through the validated USDA work instruction.