California Department of Food and Agriculture
Statewide Plant Pest Prevention and Management Program
Environmental Impact Report, Addendum #5

Ecological Risk Assessment

Urban/Residential and Nursery Treatments, Pierce's Disease Control Program

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For a list of abbreviations and glossary terms, see the Dashboard Database 4.0 – *Glossary and Abbreviations*.

1 Executive Summary

This Ecological Risk Assessment (ERA) was conducted as an addition to the ERA performed as part of the Statewide Plant Pest Prevention and Management Program Environmental Impact Report (PEIR) (CDFA, 2014a). Six new alternative scenarios for foliar applications with Altus® insecticide for the control of glassy-winged sharpshooters, a vector for Pierce's Disease, were assessed:

(1) Applications to host plants in urban/residential settings using a mechanically pressurized handsprayer or backpack sprayer

(2) Applications to containerized host plants in production nursery loading docks using a backpack sprayer, mechanically pressurized handsprayer, or boom sprayer

(3) Applications in production nursery holds using a backpack sprayer, mechanically pressurized handsprayer, or boom sprayer

(4) Applications to large production nurseries using the mechanically pressurized handsprayer or boom sprayer

(5) Aerial applications via aircraft to large production nurseries

(6) Applications to containerized host plants in indoor production nursery loading docks using a mechanically pressurized handsprayer or backpack sprayer (not evaluated in this ERA)

Note that the sixth scenario was not assessed in the ERA since the application occurs indoors at a nursery and would not result in any exposure to ecological receptors.

The methods used in this risk assessment largely followed those methods used in the previous risk assessment in the Statewide PEIR and subsequent Japanese Beetle and Pierce's Disease Control Program Addenda (#1-3) (CDFA, 2016a, 2017a, 2021a). Where methods differed, the new approaches, assumptions, and/or receptors are discussed.

CDFA and the Ardea/Blankinship & Associates Consulting team determined the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxic effects based on available scientific literature. Staff from the California Department of Pesticide Regulation (DPR) and the Office of Environmental Health Hazard Assessment (OEHHA) were briefed on the HHRA and provided review of project documents.

Similar methods were used to identify toxicity endpoints as were used for the Statewide PEIR and addenda. Similar surrogate species were used as in the Statewide PEIR, but chronic effects on insects such as the honey bee were added to the assessment because new assessment methods have been developed. Updated U.S. Environmental Protection Agency (USEPA) models such as

the Pesticide in Water Calculator (PWC) were used to employ the most current methods and models available.

The ERA relied upon the three-stage process for risk assessments: problem formulation, analysis, and risk characterization. In the problem formulation phase, California Department of Food and Agriculture (CDFA) and its risk assessment team determined the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxic effects based on scientific literature. The problem formulation stage concluded with Conceptual Site Models (CSM) that identified the complete exposure pathways carried forward in the analysis based on available information. During the analysis phase of the ERA, detailed exposure was estimated with models incorporating appropriate data and conservative assumptions. Also in the analysis phase, effect values were developed that incorporated the toxicologic properties of the chemicals along with safety factors to address uncertainty.

The risk characterization phase provided conclusions on the potential for adverse effects to occur to ecological receptors. The risk characterization phase utilized both a quantitative and qualitative assessment. If the estimated Risk Quotient (RQ) was below the Level of Concern (LOC), the potential for adverse effects was concluded to be low. If the estimated RQ was above the LOC, a qualitative assessment was conducted to incorporate information that the quantitative models are not capable of considering appropriately.

Where the quantitative assessment indicated the RQ was below the LOC, the potential for adverse effects was considered low, and no additional qualitative assessment to refine the risk conclusion was necessary. When the RQ was above the LOC, applying several qualitative considerations typically result in a refined conclusion that the potential for adverse effects would be low. The qualitative assessment includes incorporation of CDFA Best Management Practices (BMPs), consideration of the potential for species presence at an application site, incorporation of foraging range and diet, in addition to fate and transport processes such as dilution and degradation.

In the ERA, few groups of ecological receptors were found to have RQs that exceeded LOCs. These include mammals with herbivorous or insectivorous diets, terrestrial insects, including pollinators, and aquatic invertebrates. CDFA's BMPs are designed to greatly reduce, if not eliminate, movement to surface water. Therefore, actual impacts to aquatic invertebrates are anticipated to be minimal. Because of the targeted nature of the application on loading docks and nursery production areas only those insects dwelling on ornamental host plants would be directly exposed. In urban/residential settings, only host plants are treated, greatly limiting the potential for exposure to nontarget insects. Most insects, such as flying insects, would receive very limited exposure. Thus, most insects and insectivorous species are anticipated to be exposed to a limited extent and impacts would be minimal. Only herbivorous mammals that forage in urban/residential settings on or near ornamental plants are possible to be exposed.

This ERA will be used to assist CDFA in assessing the potential to affect particular species and developing site-specific measures to protect these species.

2 Introduction

This Ecological Risk Assessment (ERA) quantitatively evaluates five alternative application scenarios within the California Department of Food and Agriculture's (CDFA) Pierce's Disease Control Program (PDCP, herein referred to as the "Proposed Program") for the control of glassy-winged sharpshooter (GWSS) in nursery and urban/residential settings. This document is an addition to the Statewide Plant Pest Prevention and Management Program, Environmental Impact Report, Volume 2 - Appendix A, Ecological Risk Assessment, SCH # 2011062057 (Statewide PEIR) (CDFA, 2014a).

The primary goal of the PDCP is to minimize the statewide impacts of Pierce's disease and its vectors in California. Pierce's disease is a deadly disease of grapevines, that is caused by the bacterium *Xylella fastidiosa*. The bacterium is spread by xylem-feeding insects, most notably the GWSS. The GWSS is an invasive insect pest which established and spread in southern California in the 1980s and 1990s. It caused serious outbreaks of Pierce's disease, leading to the establishment of the PDCP in 2000 to protect California's vineyards and other resources from further damage. The five major components of the PDCP are: contain the spread, statewide survey and detection, rapid response, outreach, and research.

2.1 Purpose of the Ecological Risk Assessment

The ERA assesses potential future activities to be conducted under CDFA's Proposed Program. Specifically, the ERA focuses on pesticide applications that would be available for use to control the glassy-winged sharpshooter. The ERA evaluates the potential risk to terrestrial and aquatic species following such pesticide applications.

2.2 Approach

A detailed discussion of the approach for the ERA process is provided in the Statewide PEIR (CDFA, 2014a). For the purpose of this ERA, the term "pesticide" refers to both active and inert ingredients in the formulated pesticide product.

This ERA was conducted by using models and exposure data developed primarily by the United States Environmental Protection Agency (USEPA) in the context of typical pesticide application methods and settings in California. The ERA depended on these USEPA exposure models to estimate environmental concentrations in lieu of measured monitoring data. Most of these models, described in detail in the applicable sections of the Statewide PEIR, are Microsoft® Excel®-based user interface packages that allow for input of information specific to the Proposed Program, as well as default data when site-specific data are not available. Since multiple models were required for this ERA, and some models require the output of other models as input, it was convenient to integrate several models into one Excel workbook so that information from all models could be combined into a single risk estimate as the final output for each pesticide application scenario. This Excel workbook, as developed by Ardea Consulting and Blankinship & Associates, is referred to as the Comprehensive Risk ANalysis Kalculator (CRANK). The CRANK provides a consolidation tool to simultaneously estimate risk for the ERA and the associated Human Health Risk Assessment (HHRA).

To readily enter, store, retrieve, update and review information that serves as inputs for the various models used in the ERA and addenda, a Microsoft® Access® database with a custom user interface was created. This Microsoft Access database is referred to as the Dashboard Database. Data used previously and as part of this analysis can be found in the newest version of the Dashboard Database (4.0). It is a supplement to this report and no conclusions should be based solely on the Dashboard Database or ERA independently. To request a downloadable copy of the Dashboard Database, please email permits@cdfa.ca.gov.

The database specifically contains the following information:

- Specific details of each chemical application scenario, including application rates, maximum number of applications per year, application intervals, method of application, application area, etc.
- Pesticide product formulations, including concentration of active ingredient and, to the extent information is available, inert ingredients and adjuvants
- Physical, chemical, and fate properties of the chemicals considered in the ERA, including half-life, degradation rate, vapor pressure, solubility, molecular weight, octanol-water coefficient (Log K_{OW}) and soil adsorption coefficient (Log K_{OC})
- Toxicological properties of the chemicals considered in the ERA, as well as toxicity reference values (TRVs)
- Summary of environmental effects based on published literature
- Model specific inputs and outputs
- Tissue concentrations based on dietary exposure model results
- Size of species home and foraging ranges
- Soil concentration estimation results
- Water concentration estimation results
- Individual RQs for all surrogate species for each chemical ingredient
- Total RQs for all surrogate species for combined chemical ingredients used in an application scenario
- References, glossary terms, and abbreviations used throughout the report and Dashboard

Staff from the California Department of Pesticide Regulation (DPR) and Office of Environmental Health Hazard Assessment (OEHHA) reviewed and commented on the Proposed Program's ERA. The purpose of this involvement was to allow for peer review, facilitate the exchange of information, collaborate on methods to assess and protect ecological health and the environment, and clearly communicate these methods and results to the public.

3 Problem Formulation

Problem formulation was the first step in the ERA process. Its purpose was to establish the goals, breadth, and focus of the assessment through a systematic process to identify the major factors to be considered in the assessment. As discussed in the Statewide PEIR (CDFA, 2014a), CDFA and the risk assessment team involved staff from California Department of Pesticide Regulation (DPR) and Office of Environmental Health Hazard Assessment (OEHHA) to facilitate the

exchange of information such that this ERA meets both the public outreach and scientific goals desired by CDFA for the Proposed Program.

Problem Formulation integrated available information (sources, contaminants, effects, and environmental setting) and served to provide focus to the ERA. Additional details regarding the Problem Formulation are available in the Statewide PEIR (CDFA, 2014a).

3.1 Application Scenarios

Details regarding the application of pesticides and adjuvants, when included in the application scenario, that impact the estimation of potential risk are:

- Type of chemical
- Concentration of chemical
- Application method (*e.g.*, soil injection, fumigation, spraying)
- Duration and frequency of applications
- Rate of application
- Area of application
- Setting in which activity would occur (*e.g.*, nursery, residential)

As part of the Statewide PEIR (CDFA, 2014a), 59 application scenarios were analyzed in the PDCP. An additional nine scenarios were assessed in Addendum 3 (CDFA, 2020a) to the PEIR. The scenarios analyzed in this ERA were compared to past work to determine if they could be considered a Substantially Similar Scenario (i.e., one in which products and application details are identical or substantially similar to one or more previously analyzed scenario or differs only in ways that would not significantly increase the risk of unreasonable adverse effects on the environment).

None of the scenarios described were considered substantially similar to the scenarios analyzed in the Statewide PEIR (CDFA, 2014a) or subsequent addenda (CDFA, 2016a, 2017a, 2020a, 2021b). Therefore, PDCP-79, PDCP-80, PDCP-81, PDCP-82 and PDCP-83 were directly analyzed in this ERA.

No application scenarios in the 2014 Statewide PEIR or its addenda assessed pesticide products containing flupyradifurone. In this assessment, Altus (active ingredient- flupyradifurone; inerts-propylene carbonate and oxirane, methyl-, polymer with oxirane, monobutyl ether) was analyzed as foliar spray applications targeting ornamentals and fruit trees in an urban/residential setting when applied using mechanically pressurized sprayer or a backpack sprayer (PDCP-79). Under the Proposed Program, Altus could be applied on an outdoor loading dock (PDCP-80) or in the production areas (PDCP-81) as a foliar spray to containerized nursery stock plants using a mechanically pressurized sprayer, backpack sprayer, or boom sprayer. Additionally, Altus may be applied to all nursery stock throughout the entire nursery using a mechanically pressurized sprayer or boom sprayer (PDCP-82), or as an aerial application (PDCP-83). Altus may be applied to an indoor nursery loading dock (PDCP-84), but that scenario is only considered in the Human Health Risk Assessment (HHRA) because no exposure to ecological receptors is anticipated. In no scenario was an adjuvant used.

Consistent with the PEIR, CDFA defined the product application rate and other application details for each of the specific scenarios in the Program Material Data Sheet (PMDS) found in **Appendix Eco-A**. The defined application rate for all scenarios is 0.137 lb. flupyradifurone per acre. The following scenarios were assessed:

- **PDCP-79** consists of a single foliar application per year of Altus to a 17.5-acre area within an urban/residential setting.

- **PDCP-80** consists of up to 150 foliar applications made approximately every other day (2-day application interval) to 3750 ft^2 on the nursery loading dock.

- **PDCP-81** consists of two foliar applications made approximately 90 days apart each year to a 0.75-acre block of plants within the nursery production area.

- **PDCP-82** consists of a ground application.

- **PDCP-83** consists of an aerial application, with each scenario consisting of foliar applications made twice per year at a 6-month interval to a 130-acre nursery.

For urban/residential application scenarios, the application area was defined as a 17.5-acre area representing the entire area within the prescribed 150-m radius distance from a GWSS find. Treatments will be applied to host plants only. Within an application area, many features would not be treated, such as pavement, buildings, and lawns. Following the approach used in PEIR Addenda 1, 2, and 3 (CDFA, 2016a, 2017a, 2020a), it was assumed approximately one-third of the entire area was treated.

For nursery scenarios involving applications to containerized plants, it was assumed that treated containers were arranged such that approximately 80% and 60% of the pesticide from ground and aerial applications, respectively, was contained within the pot or deposited on foliage directly above the pot for ground applications, while approximately 20% and 40% of the pesticide from ground and aerial applications, respectively, was assumed to be subject to transport to water. Because the arrangement and density of treated containers may vary, making this assumption adds uncertainty as exposure estimates may be over- or under-estimated based on site-specific conditions.

3.2 Active and Inert Ingredients

Consistent with the methods described in the Statewide PEIR, data on physical, chemical, and environmental fate (PCF) properties were reviewed from the sources below. Any sources utilized during previous Statewide PEIR analyses were also considered.

- USEPA Reregistration Eligibility Decision (RED) documents (USEPA, 2020b)
- DPR Risk Characterization Documents (RCD) (DPR, 2020a)

- ATSDR Toxicological Profiles (ATSDR, 2020a)
- National Center for Biotechnology Information (NCBI) PubChem Database (PubChem, 2021a)
- United Nations Environmental Programme (UNEP) Screening Information Dataset System (SIDS) Initial Assessment Profiles (UNEP, 2017a)

When multiple suitable values were available, final PCF values utilized in the risk analysis were calculated consistent with the methods described in the Statewide PEIR. The PCF data selected and estimated final values selected for risk assessment are available in the *Chemical Details* section of the Dashboard Database 4.0. If PCF data were not available for a given chemical, a suitable surrogate was selected, when possible, based on its similarity in chemical structure and physical properties.

For the purpose of this ERA, "pesticides" included pesticide active and inert ingredients. The risk assessment team investigated the Altus label and Safety and Data Sheet (SDS) to determine the list of active and inert ingredients.

Two inert ingredients, propylene carbonate (42.8%) and oxirane, methyl-, polymer with oxirane, monobutyl ether (40.0%) were identified in Altus. Altus contains 17.09% flupyradifurone. No ecotoxicity data were identified for oxirane, methyl-, polymer with oxirane, monobutyl ether, and insufficient chemical property data were available to model environmental fate for oxirane, methyl-, polymer with oxirane, monobutyl ether. Therefore, potential impacts from oxirane, methyl-, polymer with oxirane, monobutyl ether could not be estimated. For Altus, the SDS lists all ingredients and no inert ingredients are unknown.

The ingredients were researched for chemical characteristics, including toxicity, as well as their environmental fate properties. Applicable environmental fate characteristics for the chemicals evaluated in this ERA can be found in the relevant sections of the Dashboard Database associated with the Statewide PEIR and updated with data from this assessment. The summary below for oxirane, methyl-, polymer with oxirane, monobutyl ether describes why it was not considered in the analyses.

3.2.1 Flupyradifurone

Flupyradifurone is a butenolide insecticide (Subgroup 4D) that is applied through foliar and soil drench treatments to a broad spectrum of ornamental and agricultural crops, such as pome fruit and corn. It may also be used for seed treatment on soybeans (USEPA, 2014e). It is a systemic insecticide (when applied as a soil treatment) and translaminar when applied through foliar treatment and acts as a nicotinic acetylcholine receptor agonist (Health Canada, 2015a; FAO, 2017a; USEPA, 2016d)

A chemical summary for the active ingredient flupyradifurone may be found in the Dashboard Database 4.0, *Chemical Details* section.

3.2.2 Difluoroacetic Acid (DFA)

Difluoroacetic acid (DFA) is one of four major degradants of flupyradifurone that has been observed in aerobic environments in fate studies of flupyradifurone (USEPA, 2014e). Generally speaking, most degradants are less toxic than the parent compound to humans. However, DFA was considered for inclusion in the current assessment because DFA is reported to have similar mammalian toxicity to flupyradifurone.

Based on findings presented in the HHRA and Dashboard Database (4.0) chemical summary, DFA is of similar but not greater toxicity than flupyradifurone. Therefore, in lieu of conducting individual assessments of each chemical, flupyradifurone toxicity values were considered applicable to or protective of those associated with DFA in this ERA. Consistent with the approach used or recommended by organizations such as USEPA, the Australian Pesticides and Veterinary Medicines Authority (APVMA), and the European Food Safety Authority (EFSA) (APVMA, 2018a; EFSA, 2015a; USEPA, 2016d), flupyradifurone residues were defined as the sum of flupyradifurone and DFA. Environmental fate data selected for exposure assessment was representative of the combination of flupyradifurone and its degradation products, including DFA, where applicable. Although degradants other than DFA may or may not constitute residues of concern, they were conservatively assumed to consist of solely DFA in the current analysis.

Information presented here on DFA is included in the flupyradifurone chemical summary within the *Chemical Details* section of the Dashboard Database 4.0.

3.2.3 Propylene Carbonate

Propylene carbonate is a carbonate ester derived from propylene glycol that is used in the production of a wide variety of products as a polar aprotic solvent (USEPA, 1998i). It is often used as an inert ingredient in pesticide formulations, but also as a plasticizer and chemical intermediate. It is not expected to have prolonged environmental persistence, as it is susceptible to both direct photolysis and hydrolysis (HSDB, 2003d).

A chemical summary for the inert ingredient propylene carbonate may be found in the Dashboard Database 4.0, *Chemical Details* section.

3.2.4 Oxirane, methyl-, polymer with oxirane, monobutyl ether

Because inert ingredients are often considered confidential business information, their identity is not disclosed and as a result cannot always be assessed. In the case of oxirane, methyl-, polymer with oxirane, monobutyl ether, no discrete human toxicity data were identified for the species known to be in Altus and insufficient chemical property data were available to model environmental fate for this class of chemicals.

Oxirane, methyl-, polymer with oxirane, monobutyl ether is a copolymer of ethylene and propylene oxide and falls under a large class of chemicals that share the CAS# 9038-95-3, with molecular weights ranging from 176.254 to >4,000 (CIR, 2017a; NIEHS, 2020a). Chemicals under the CAS# 9038-95-3 may be used in personal care products, such as shampoo, eye makeup remover, and fragrance ingredients, as a surfactant/emulsifying agent, as a chemical

intermediate, and may be formulated as specialized lubricants (CIR, 2017a; DOW, 2015a; USDA, 2013a). However, due to the lack of distinct identification of what form(s) of oxirane, methyl-, polymer with oxirane, monobutyl ether are present in Altus, and a lack of environmental fate data to properly characterize the vast properties of this group, the, potential impacts from oxirane, methyl-, polymer with oxirane, monobutyl ether could not be estimated.

Information presented here on oxirane polymer is summarized within the Chemical Details section of the Dashboard Database 4.0.

3.3 Environmental and Ecological Settings

The application scenario evaluated as a foliar application (PDCP-79) in an urban/residential setting includes applications to foliage of host plants. Applications to vegetables are not permitted under PDCP-79, and applications do not target lawns, but grass could receive spray deposition from application to nearby host plants. Applications to fruit trees are possible. Urban/residential settings include: homes, parks, schools, sports fields, commercial settings, cemeteries, greenbelts, and road sides.

The application scenario evaluated as a foliar application of Altus (PDCP-80) on a loading dock in this ERA includes applications to containerized nursery stock only. Overspray to the loading dock surface could occur. The application scenario evaluated as a foliar application of Altus (PDCP-81) to a nursery production area in this ERA includes applications to containerized nursery stock only. Overspray to the surface of the nursery production area could occur. The application scenario evaluated as a foliar application of Altus (PDCP-82, PDCP-83) to the entire nursery production area in this ERA includes applications to containerized nursery stock only, with overspray of the surface of the nursery production area likely.

To determine the types of species that could be exposed as a result of these scenarios, the range of locations where the scenario could occur and the ecological characteristics of those locations were investigated. A more detailed discussion of the Environmental and Ecological Settings can be found in the Statewide PEIR (CDFA, 2014a).

3.4 Assessment Endpoints and Measures of Ecological Effect

An endpoint is the outcome of an effect on an ecological component, for instance, increased mortality of fish due to a pesticide application. An assessment endpoint is the specific statement of the environmental effect that is going to be protected, such as the prevention of fish mortality due to a pesticide application. Measurement endpoints are measurable attributes used to evaluate the risk hypotheses and are predictive of effects on the assessment endpoints (USEPA, 1998g). Since a specific individual of a species may have different mortality susceptibility compared to other individuals of the same species, it is common to use a statistical representation to define what is meant by the assessment endpoint. For instance, it is common to assess mortality by using the lethal dose at which 50 percent of the population in a study failed to survive (LD_{50}).

Assessment endpoints are the ultimate focus in risk characterization and link the measurement endpoints with the risk decision making process. The ecological effects that the ERA is intended

to evaluate are determined by the assessment endpoint which is characterized by a specific measurement endpoint. The specific assessment and measurement endpoints that form the basis of this ERA are discussed in the following sections.

3.4.1 Assessment Endpoints

Three principal criteria were used to select ecological characteristics that may be appropriate for assessment endpoints: (1) ecological relevance, (2) susceptibility to known or potential stressors, and (3) relevance to management goals. Of these, ecological relevance and susceptibility were essential for selecting assessment endpoints that are scientifically defensible (USEPA, 1998). Although stressors can consist of many different environmental factors, the stressors addressed in this ERA are those effects related to pesticides. This ERA's endpoints focused on organism-level outcomes. These included adverse effects such as mortality, reproductive effects, and pathological changes (*e.g.*, kidney or liver tissue damage) (USEPA, 2003c).

The acute assessment endpoints selected in the ERA include the prevention of mortality in:

1. Soil-dwelling invertebrates, non-target insects, aquatic invertebrates including benthic invertebrates, aquatic-phase amphibians, and fish;
2. Terrestrial-phase amphibians, reptiles, birds, and mammals that eat insects (*i.e.*, insectivores) or invertebrates (*i.e.*, invertivores);
3. Herbivorous reptiles, birds, and mammals;
4. Reptiles, birds, and mammals that eat fish (*i.e.*, piscivores);
5. Terrestrial-phase amphibians, reptiles, birds, and mammals that eat both plants and animals (*i.e.*, omnivores);
6. Bird and mammals that eat seeds (*i.e.*, granivores); and
7. Carnivorous amphibians, reptiles, birds, and mammals.

The chronic assessment endpoints selected for the ERA included the protection of survival and reproduction of the same species groups.

Typically, reproduction is a more sensitive endpoint than survival. Thus, this endpoint was used over survival when it is available to result in a more conservative analysis. Adverse reproductive effects generally do not materialize until chronic exposures have occurred.

3.4.2 Measurement Endpoints

In terms of measurement endpoints, measures of exposure were used to evaluate levels at which exposure may occur whereas measures of effect were used to evaluate the response of the assessment endpoints if exposed to stressors. Concentration of pesticides in water was a measure of exposure for an aquatic species, and daily intake of pesticides in dietary items, soil, and drinking water was a measure of exposure for terrestrial species. The concentration in water or the amount of daily ingestion of pesticides that causes adverse effects were measures of effects. The quantitative analysis assumed that a given species was present and did not address the likelihood that the species may actually occur in proximity to a specific pesticide application. The likelihood of presence at the application site was addressed qualitatively in the risk characterization.

In this ERA, toxicity is reported as TRVs, which are numerical representations of the measurement effects that are used in the risk assessment. A TRV is a toxicological index that, when compared with exposure, is used to quantify risk to an ecological receptor. The way in which TRVs are developed depends on available data on a pesticide's toxicological effects and commonly accepted assumptions that address uncertainty regarding the available data. TRVs are developed according to a highly structured and rigorous approach. This process often includes adjustments to observed laboratory values to account for uncertainty and application of safety factors to ensure that results of the risk assessment are conservative and ensure protection against adverse effects. TRVs are used to represent measurement endpoints of the environmental concentrations or daily doses (mg/kg bw-day) with uncertainty factors incorporated, such that exposure at levels above the TRV are likely to cause adverse effects for a species. If the estimated environmental concentration (EEC) or the estimated daily dose (EDD) of a pesticide exceeds the TRV, concern is triggered regarding the potential for an adverse effect to an organism.

Complete details of the methods for developing TRVs for the pesticides and species evaluated in this ERA are described in Section 4: Effects Assessment of the ERA in the Statewide PEIR (CDFA, 2014a). Specific measurement endpoints used to develop the TRVs include no observable adverse effect levels (NOAELs), lowest observable adverse effects levels (LOAELs), and the median lethal (or effective) dose or concentration (*e.g.*, LD_{50}, ED_{50}, LC_{50}, or EC_{50}). Acute TRVs are based on results from acute toxicity tests. Chronic TRVs are based on chronic endpoints (*i.e.*, long term defined as greater than 10% of the animal's lifespan) when available. Subchronic endpoints (repetitive exposures during less than 10% of the animal's lifespan but greater than 14 days) (USEPA, 1999h) were used when no chronic endpoints are available. Acute endpoints were used only in cases where no chronic or subchronic endpoints were available. Appropriate safety factors were applied to convert acute or subchronic endpoint to chronic TRVs (U.S. Army, 2000; USEPA, 2004j). These TRVs were the measurement endpoint for the active/inert ingredient-species combination.

For many amphibians and reptiles, toxicity data from other taxonomic groups were used for TRV development. For the aquatic-phase for amphibians, fish, such as the rainbow trout, were often used to derive an appropriate TRV. For reptiles and terrestrial-phase amphibians, bird toxicity values acted in place of specific toxicity values for reptile or terrestrial amphibian species (USEPA, 2004j).

3.5 Surrogate Species Selection

Numerous species occur in California. This ERA did not assess risk for every species, as such an assessment would be infeasible. The selection criteria and process by which surrogate species were selected, along with a complete list of species and their life history traits, can be found in the Statewide PEIR (CDFA, 2014a) as well as the relevant sections of the associated Dashboard Database.

3.6 Conceptual Site Models

Development of conceptual site models (CSMs) is a fundamental part of the risk assessment process, and their inclusion in the ERA is intended to allow the reader to understand the exposure pathways that were evaluated for the application scenario. The CSM is a written and visual representation of predicted relationships among stressors (*e.g.* a pesticide application), exposure pathways (*e.g.* eating vegetation contaminated with the pesticide), and assessment endpoints (*e.g.* mortality). It outlines the potential routes of exposure for each assessment endpoint and includes a description of the complete exposure pathways. An exposure pathway demonstrates how a pesticide would be expected to travel from a source (pesticide application) to a plant or animal that can be affected by that pesticide. An exposure pathway that is not complete means that it is unlikely for that organism to be exposed to the pesticide by that exposure route. Application-specific CSMs are presented below.

The ecological CSM covers the multiple pathways through which ecological receptors could be exposed to pesticides that may be applied under the Proposed Program. The starting point of each CSM is the application technique, which determines the characteristics of release of the pesticides into the environment. The possible pesticide application techniques addressed in this ERA for PDCP-79 is a foliar spray in an urban/residential setting; and PDCP-80, PDCP-81, PDCP-82, PDCP-83, and PDCP-84 are foliar spray applications in nurseries.

Additional details regarding the development and interpretation of CSMs can be found in Section 2.6: Conceptual Site Models of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a).

3.6.1 Pierce's Disease Control Program

Figure Eco-1 provides details for foliar applications that can occur in urban/residential settings (PDCP-79). Complete exposure pathways exist for inhalation or dermal contact with vapors, droplets, or mist following foliar applications for all terrestrial species. The only ecological receptor for which adequate dermal exposure and toxicity data existed was terrestrial insects via dermal contact exposure. The exposure pathway for terrestrial insects was complete via ingestion of foliage and pollen or nectar following uptake from treated soil or from deposition following foliar sprays. Therefore, dermal contact exposure was analyzed. Exposure pathways for terrestrial vertebrates were complete for dermal contact and ingestion of surface water, vegetation, and soil. However, adequate exposure and toxicity data existed only for the ingestion pathway for terrestrial vertebrates, so the dermal and inhalation pathways, although potentially complete, were not quantitatively evaluated. The exposure pathway for fish and aquatic invertebrates, including benthic invertebrates, is complete via surface water and sediments with pesticide deposits from transport on/through soil beneath treated plants and from the possibility of drift when foliar applications are made adjacent to surface waters. However, toxicity data for ingestion of contaminated food items or ingestion of water or sediment by aquatic species was unavailable preventing quantitative assessment, so only immersion in surface waters containing pesticide residues was quantitatively analyzed.

Figure Eco-2 provides details for foliar applications that can occur in outdoor nursery settings (PDCP-80, PDCP-81, PDCP-82, and PDCP-83). Complete exposure pathways exist for inhalation or dermal contact with vapors, droplets, or mist. The only ecological receptor for which adequate dermal exposure and toxicity data exists was terrestrial insects via dermal contact exposure. The exposure to terrestrial insects was complete via ingestion of treated foliage and pollen or nectar, and toxicity data were available for these receptors. Therefore, ingestion and dermal contact pathways were analyzed for terrestrial insects. Exposure pathways for terrestrial vertebrates were complete for inhalation, dermal contact, and ingestion of surface water, vegetation, and soil. Adequate exposure and toxicity data existed only for the ingestion pathway, so the inhalation and dermal pathways, although potentially complete, were not considered. The exposure pathway for fish and aquatic invertebrates, including benthic invertebrates, was complete via surface water and sediment following deposition from drift or from movement through or over soil beneath treated plants. However, adequate toxicity data for ingestion of contaminated food items or ingestion of water by aquatic species was unavailable, so only effects from exposure via immersion in pesticide-containing surface water and sediments were analyzed.

Figure Eco-3 provides details for foliar applications that can occur in indoor nursery settings (PDCP-84). No complete exposure pathways exist for inhalation or dermal contact with vapors, droplets, or mist. Exposure pathways for terrestrial vertebrates also were not complete for inhalation, dermal contact, and ingestion of surface water, vegetation, and soil. The exposure pathway for fish and aquatic invertebrates, including benthic invertebrates, was not complete via surface water or sediment. It was assumed that an indoor application does not lead to any exposure for any ecological receptors. Because there are no complete exposure pathways, the indoor application of Altus is not analyzed in the ERA.

3.7 Analysis Plan

This ERA used widely accepted models specific to ecological risk assessment to estimate the exposures outlined by the CSM. In addition, effects data for the measurement endpoints used data available from the scientific literature. Since the applications adhering to scenarios analyzed in this ERA could occur in various locations in California, many of which would be unlikely to occur on a routine basis, it was not considered practical to collect and utilize field or site-specific data.

The analysis plan for the CSMs was implemented in the next phase of the ecological risk assessment process: Analysis. The Analysis phase is subdivided into two sections: exposure assessment and effects assessment.

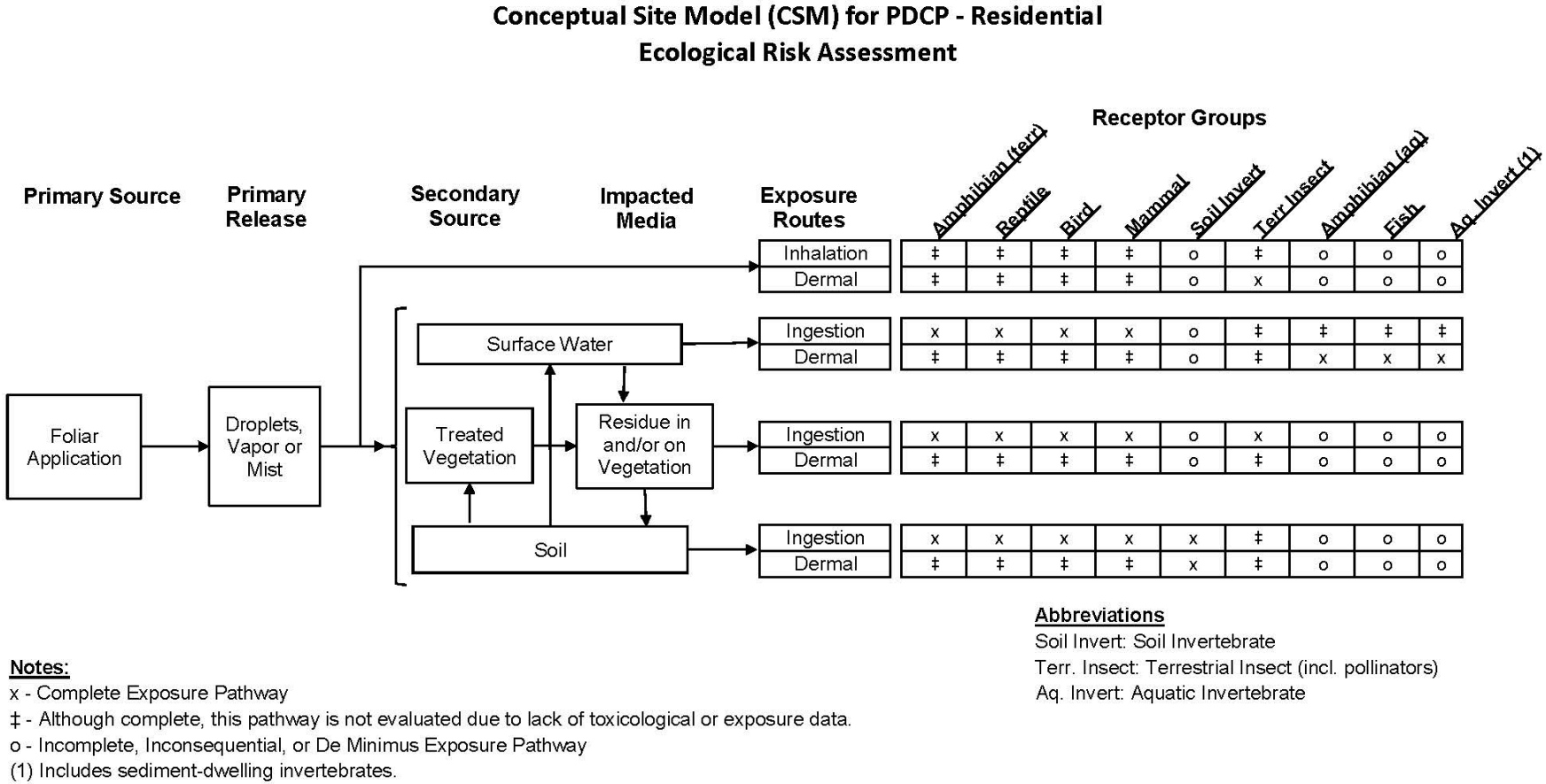

Figure Eco-1. Pierce's Disease Control Program Foliar Urban/Residential Conceptual Site Model

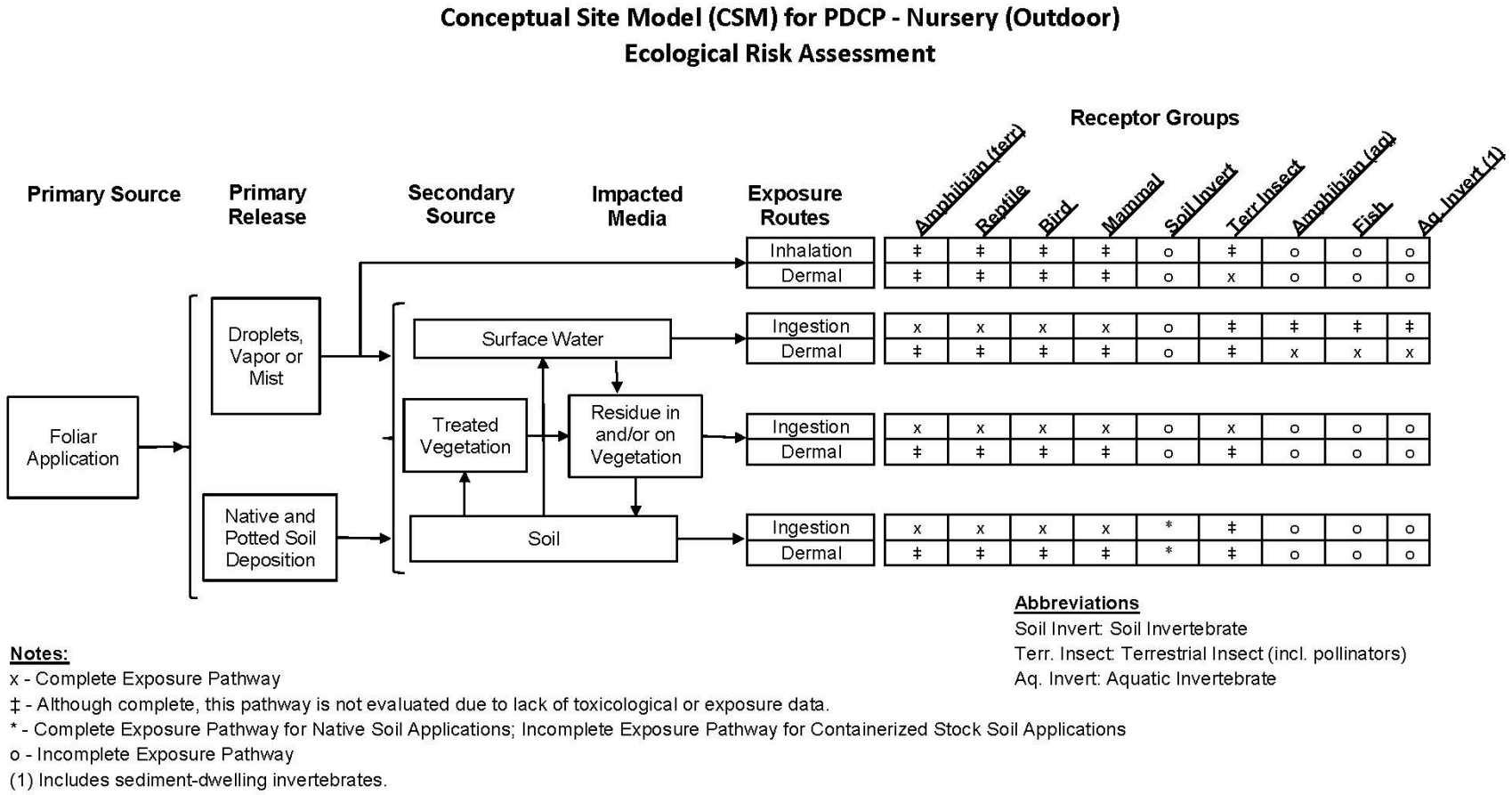

Figure Eco-2. Pierce's Disease Control Program Outdoor Foliar Nursery Conceptual Site Model

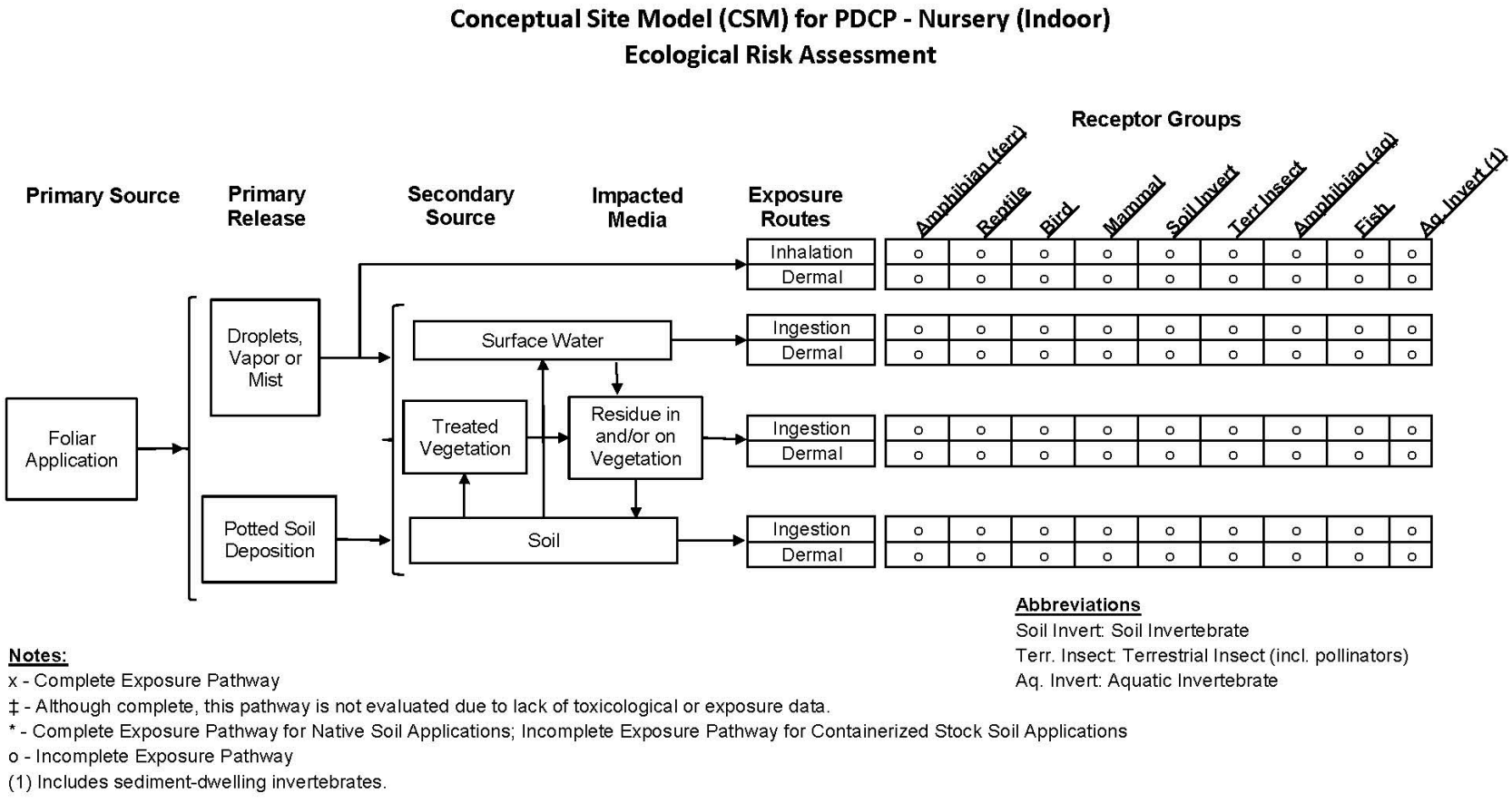

Figure Eco-3. Pierce's Disease Control Program Indoor Foliar Nursery Conceptual Site Model

4 Exposure Assessment

The exposure assessment is part of the analysis phase of the risk assessment process that follows the problem formulation phase described in Section 3. The exposure assessment provides a description and quantification of the nature and magnitude of the interaction between pesticides in surface water, sediment, soil, or diet and the ecological receptors. This quantitative accounting of the amount of exposure is known as the EEC and is the main outcome of the exposure assessment. The EEC is defined as the predicted concentration of a pesticide within an environmental compartment (*i.e.* within soil, water, plant tissue, or a specific organism) based on estimates of quantities released, discharge patterns and inherent disposition of the substance (*i.e.* fate and distribution), as well as the nature of the specific receiving ecosystems. The results of the exposure assessment (*i.e.* the EECs) are combined with the effects assessment to derive the risk characterization results in the final phase of the risk assessment process.

The EEC is defined as the predicted concentration of pesticide within an environmental compartment (i.e., soil, water, plant tissue, or a specific organism) based on estimates of quantities applied, application methods, chemical-specific fate and transport properties, and the nature and characteristics of the application and surrounding area.

Because no empirical data were available for the Proposed Program, EECs were estimated using various models that have been developed for use in risk assessments. These models are designed to use conservative assumptions and in many cases are not capable of modeling all of the complex fate and transport processes that can occur once a pesticide and/or adjuvant is released into the environment. Typical fate properties that tend to decrease the concentration of pesticide chemicals include aerobic degradation, anaerobic degradation, photodegradation, absorption, solubilization, and volatilization. Key transport properties that may not be accounted for are dilution and partial transfer between media such as plants, soil, water, and air. Therefore, most of the EECs represented an upper-bound, conservatively high value since not all fate and transport properties have been modeled.

Most procedures for estimating EECs for the Proposed Program were consistent with those used in the Statewide PEIR (CDFA, 2014a).

Exposure assessments are broken down between acute (short term) and chronic (long term) exposures, described in detail below. Several exposure models and assumptions are required to estimate the amount of pesticides that an organism is exposed to as the pesticides get transported along the various exposure pathways. The exposure models and assumptions for acute and chronic exposures, for each receptor group in general, in aquatic and terrestrial environments, and under each application scenario were described in the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a) or subsequent Addenda (CDFA, 2016a, 2017a, 2020a). Only those pathways or models new or unique to this assessment are included below.

Since it was not possible for this ERA to evaluate exact concentrations and exposures in the field, EECs were estimated using various conservative models that have been developed for use in risk assessments. These models are designed to use conservative assumptions and in many

cases are not capable of modeling all the complex fate and transport processes that can occur once the pesticides are released into the environment (*e.g.*, dilution in estuarine/marine water bodies or flowing rivers or streams). Typical fate properties that tend to decrease the concentration of a pesticide include aerobic degradation, anaerobic degradation, photolysis, hydrolysis, absorption, solubilization, and volatilization. Key transport properties that may not be accounted for are dilution and partial transfer between media such as plants, soil, water, and air. Therefore, most of the EECs represented an upper-bound value since not all fate and transport properties could be modeled.

4.1 Acute and Chronic Exposure

Please refer to the Statewide PEIR for an explanation of how acute and chronic exposures were determined (CDFA, 2014a).

4.2 Assumptions for Exposure Following Foliar Applications

Please refer to the Statewide PEIR for an explanation of how EECs were estimated following foliar applications (CDFA, 2014a). The exposure estimates for most environmental concentration procedures and models remained the same as were described in Section 3.2: Chronic Exposure of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). A brief discussion is presented here. For full details, please see the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). Estimation methods for uptake of residues from soil into plants were updated. Concentrations in surface water were estimated using the USEPA's Pesticide in Water Calculator (PWC) rather than the outdated PE5 model.

4.2.1 Concentration in/on Vegetation

4.2.1.1 Concentration in/on Terrestrial Vegetation

Uptake by plants from soil was estimated in a similar manner as in the Ecological Risk Assessment of the PEIR (CDFA, 2014a). Plant surface residues following a foliar application were estimated using USEPA's T-REX model.

For plant uptake from soil, a revised Briggs equation was used to estimate a Terrestrial Vegetation Uptake Factor (VUF) based on the updated version provided by USEPA (2014a). First, the K_{ow}-specific Transpiration Stream Concentration Factor (TSCF) was calculated to

estimate the relative potential for the translocation of a chemical within a plant, based on the equation:

$$TSCF = [-0.0648 \times (\text{Log } K_{ow})^2 + 0.241 \times \text{Log } K_{ow} + 0.5822]$$

Where:

TSCF = Transpiration Stream Concentration Factor
K_{ow} = Octanol/Water Partition Coefficient (unitless)

Using the TSCF and other inputs as described below, the modified Briggs equation (USEPA, 2014a) was utilized to yield the Terrestrial Vegetation Uptake Factor (VUF) in wet weight:

$$\text{Terrestrial VUF} = ([10^{(0.95 \times \text{Log } K_{ow} - 2.05)} + 0.82] \times TSCF \times \left[\frac{\rho}{\theta + \rho \times K_{oc} \times f_{oc}}\right])$$

Where:

VUF = Vegetation uptake factor
K_{ow} = Octanol/Water Partition Coefficient (unitless)
ρ = soil bulk density (g/cm^3)
θ = soil-water content by volume (cm^3/cm^3)
K_{oc} = soil organic carbon-water partitioning coefficient (cm^3/g-organic carbon or L/kg-organic carbon)
f_{oc} = fraction of organic carbon in the soil

The values of ρ, θ, and f_{oc} were from USEPA (2006y, 2008t) data associated with its Pesticide Root Zone Model (PRZM) parameters representing Exeter loam for urban/residential setting and Cieneba soils for nursery settings. See Section 4.2.2: Surface Water Concentrations for more details. Once the terrestrial VUF was estimated, it was multiplied by the concentration of pesticides in soil to get the EEC in terrestrial vegetation due to uptake from soil:

$$EEC = VUF \times \text{Soil Concentration}$$

Complete details regarding how the Briggs equation was used appear in the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). In keeping with the guidance in USEPA (2014a), if the Log K_{ow} was greater than 5.0, no uptake was assumed. When the Log K_{ow} was negative, the TSCF was assumed to be 1.0 (Collins *et al.,* 2006). The EECs estimated and used in this assessment appear in the Dashboard Database.

4.2.1.2 Concentration in Aquatic Vegetation

The Briggs equation was used to estimate concentrations in aquatic vegetation in a similar manner as was performed in the Statewide PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in Dashboard Database**.**

4.2.2 Surface Water Concentrations

The concentration of pesticides in surface water resulting from drift, runoff, or erosion during and after pesticide applications was estimated using USEPA's (2016f) PWC (Version 1.52), the

successor to PE5 and the Surface Water Concentration Calculator (SWCC). The PWC incorporates two distinct, but connected models to simulate transport from soil to water: the Pesticide Root Zone Model version 5.0+ (PRZM) and the Variable Volume Water Body Model (VVWM). PRZM is a one-dimensional, dynamic, compartmental model that can be used to simulate pesticide movement in unsaturated soil systems within and immediately below the plant root zone. VVWM contains a set of process modules that link fundamental chemical properties to the limnological parameters that estimate the kinetics of fate and transport in aquatic systems. The PWC estimates pesticide concentrations in the water as the upper 90th ranked annual peak, 1-day average, 4-day average, 21-day average, 60-day average, and 365-day average of the simulation as well as the mean value of all daily concentrations in the simulation. The PWC also estimates the upper 90th ranked annual and 21-day average sediment pore water peak concentrations as well as the annual and 21-day concentration in sediment.

The standard PRZM/VVWM runoff modeling scenario is based on site-specific conditions of fields draining into water bodies for drinking water and aquatic exposure assessments. Each PRZM simulation represents a unique combination of climatic conditions, crop-specific management practices, soil-specific properties, site-specific hydrology, and pesticide-specific application and dissipation processes. Daily edge-of-field loadings of pesticides dissolved in runoff waters and adsorbed to entrained particles, as predicted by PRZM, are discharged into a standard water body, and simulated by VVWM. VVWM accounts for volatilization, sorption, hydrolysis, biodegradation, and photolysis of the pesticide (USEPA, 2016e).

The PRZM standard scenario, referred to in the model documentation as the "farm pond scenario," was used for pesticide exposure assessments because it focuses on exposure to ecological receptors (Wild and Jones, 1992). The default "farm pond" is defined as a one-hectare (2.47-acre) body of water, 2 meters (6.56 feet) deep equaling 20,000 cubic meters (706,293 cubic feet). In determining watershed dimensions, the USEPA farm pond scenario defaults were used with two exceptions: field area and hydraulic length. Field area for nursery applications to containerized plants was defined for each scenario as 20% and 40% of the field area listed on the PMDS for ground and aerial applications, respectively (see below for rationale). The hydraulic length was calculated as the square root of the selected field area to provide the depth of a field assumed to be a square. Limnetic or water column concentrations in a waterbody were used for drinking water for wildlife as well as exposure for fish and other aquatic species. Sediment and sediment pore-water concentrations were used for exposure to benthic invertebrates. The water volume in the water body was assumed to remain constant and no outflow was modeled.

It is possible that pesticide applications under the Proposed Program could be made in proximity to flowing water such as rivers or streams or other water bodies with inflow and outflow. These waterbodies will experience dilution of water concentrations due simply to introduction of fresh water. Additionally, large streams or lakes or ponds larger than the modeled waterbody will not achieve the modeled concentrations due to the dilution in a larger volume of water. Similarly, marine/estuarine environments will not achieve the modeled concentrations due to larger volumes of water and flushing from tidal and wave action.

USEPA's AgDRIFT model values for application efficiency and spray drift loading were used in previous analyses in the Statewide PEIR (CDFA, 2014a) and Addenda (CDFA, 2016a, 2017a,

2020a). In the current analysis, the application efficiency and spray drift percentages used were 99% and 1%, respectively, for ground applications and 95% and 5%, respectively, for aerial applications based on the PWC User Manual (USEPA, 2017c).

PRZM Scenario Files were selected based on similarities between application location and setting and the environment modeled by the scenario file. The CAnurserySTD_V2 scenario represents outdoor ornamental nursery scenarios in southern California and was selected to simulate nursery applications. Topographical conditions as well as cultivation practices and plant types vary greatly among nurseries. To be protective of the many diverse nursery conditions that exist, the CAnurserySTD_V2 scenario was developed to represent conservative nursery practices that will yield "high-end" runoff. The scenario was parameterized primarily using data from outdoor ornamental nurseries in San Diego, CA since it is the county with the greatest number of acres in production within the region. According to the *Southern California Outdoor Ornamental Nursery Scenario* description file provided by USEPA (2008t) for use with the PWC:

> "Nursery soils in southern California are commonly sandy loams (Jim Bethke, personal communication [sic]). Exact locations and geographic extent of nurseries in the region are not available; therefore, soils were selected based on soil recommendations of local experts, the geographic extent of nursery supporting soils in the area, the drainage group, slope, and erodibility. The Cieneba series was selected for this scenario since it is a sandy loam, is of large extent in the region, and is a hydrologic group C soil."

Since not all nursery loading docks would necessarily be paved, loading docks were assumed to be permeable surfaces such as gravel. The slope used for previous nursery application scenarios in the Statewide PEIR (CDFA, 2014a) was 5%. However, consistent with typically observed nursery settings, both the loading docks and surrounding areas are generally flat. Therefore, a slope of 2% was selected for nurseries to reflect these conditions. Note that the model results are largely insensitive to slope and both 2% and 5% slopes yield similar water quality results.

For ground applications to containerized nursery stock, a 1-foot diameter container was assumed to be placed in each square foot of area treated. Therefore, approximately 80% of the pesticide was assumed to be deposited on foliage or contained within the pot, while approximately 20% of the pesticide was assumed to drift to soil and be subject to transport to water. Note that this is a generalized estimate based on the assumed density and placement of the containers and is applicable to containers of all sizes that are similarly placed end-to-end. Based on CDFA's expert opinion and correspondence with nursery staff, the average container size used in production nurseries was considered to be a 5-gallon container with a surface area of 0.55 square feet. A 60% reduction in the PMDS-derived field area for aerial applications to nurseries was consistent with the default canopy cover included in the CAnurserySTD_V2 scenario and is based on high-resolution color aerial photography of ornamental nurseries in San Diego County.

For urban/residential applications, where fruit trees are treated, CAfruit_WirrigSTD was selected. Note that, although previous analyses in Addenda for the Statewide PEIR (CDFA, 2016a, 2017a) have incorporated analyses of impervious surfaces using PRZM impervious surface scenarios, such an approach would not be appropriate for this analysis. Unlike previous

analyses, which evaluated applications to turf and groundcover next to pavement, the scenarios included in this assessment evaluate applications to fruit trees that are not typically adjacent to pavement or other impervious surfaces. Thus, the surface water contribution from applications or spray drift to or near impervious surfaces is considered negligible. All PRZM scenario parameters were left at their default values. Within urban landscapes, roughly 1/3 of the total treatment area listed in the PMDS occupy potential treatment locations (*e.g.*, host plants along with the areas that could receive overspray). Thus, the field area modeled for urban/residential applications was 1/3 the field area listed in the PMDS. Scenario-specific PMDS are provided in **Appendix Eco-A**.

The PWC uses USEPA (2006z) weather files containing weather data from 1961 through 1990. The San Francisco meteorological file (W23234.dvf) was selected for statewide scenarios, while the Los Angeles meteorological file (W23174.dvf) was selected for scenarios geographically limited to Southern California. The starting application dates selected for urban/residential and nursery applications were March 1st and January 1st, respectively. All other application details are defined in the PMDS (**Appendix Eco-A**). The EECs estimated and used in this assessment appear in the Dashboard Database.

Nursery and urban/residential scenarios in which residues on treated foliage may be subject to wash-off from rainfall were modeled as foliar (Above Crop) applications. PWC models residues washed off foliage following one or more applications based on foliar degradation rates. Nursery scenarios involving applications on a loading dock prior to shipment were modeled as bare ground (Below Crop) applications because treated plants would be removed shortly after treatment making them unavailable to contribute washed off residues.

The PWC determines a Henry's Law Constant based on the molecular weight, vapor pressure, and water solubility. Since the soil organic carbon/water partition coefficient (K_{oc}) better predicts the mobility of organic contaminants in soil, K_{oc} values were used in preference to the soil/water partition coefficient (K_d). Water bodies modeled through PWC are fixed at pH 7 (USEPA, 2016e) therefore neutral hydrolysis half-lives (pH 7) were used as inputs. A reference temperature of 25°C was selected for each degradation pathway and a value of 40°N was selected for the photolysis reference latitude. Chemical-specific physical and chemical properties are presented in the Dashboard Database.

Pesticide residues remaining on foliage were assumed to be removed after harvest for nursery scenarios and retained as surface residue (Left as Foliage) and continue to undergo decay and wash-off for urban/residential scenarios. The default harvest removal date was November 1 for nursery scenarios and August 1 for urban/residential scenarios.

The PWC limits the number of applications to 50 applications per year. Through collaboration with Houbao Li, environmental engineer at the USEPA, this limitation was overcome through expanding the PRZM input files generated by the PWC for 50 applications out to 150 applications and feeding those input files manually into the VVWM to generate results (H. Li, USEPA, personal communication, August 5, 2020).

4.2.3 Soil Concentrations

As described in Section 3.5:Terrestrial Estimated Environmental Concentrations of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a), deposition to soil following a foliar application was assumed to be 20%. The EECs estimated and used in this assessment appear in the Dashboard Database.

4.2.4 Concentrations in Insects

The USEPA T-REX model and the Briggs equation were used to estimate concentrations in insect prey items in a similar manner as was performed in the Statewide PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in the Dashboard Database.

4.2.5 Tissue Concentrations in Aquatic Organisms

As described Section 3.3.2: Chronic Exposure in Aquatic Species of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a), tissue concentrations in aquatic organisms were estimated using the USEPA's KABAM model (K_{ow} (based) Aquatic BioAccumulation Model) (USEPA, 2009s). The EECs estimated and used in this assessment appear in the Dashboard Database.

4.2.6 Honey Bee and Non-target Insect Exposure

The USEPA released guidance for assessing risk to honey bees (USEPA, 2014a) that includes additional guidance on estimating acute and chronic exposure of larval and adult bees or non-target insects to pollen and nectar. The methods in the guidance document are otherwise essentially the same as those presented in the Statewide PEIR (CDFA, 2014a) based on the previous methods (USEPA, 2012g).

4.3 Oral Ingestion Exposure Calculations

No changes were made to how dietary exposures were estimated. Please see Section 3.4: Terrestrial Exposure Assessment of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a) for a full description of how oral ingestion exposure was estimated.

4.3.1 Area Use Factor

To acknowledge that some species' food could be acquired from outside the area receiving pesticide treatments, an Area Use Factor (AUF) was calculated for each species and each pesticide application scenario based on the species' foraging range and typical treatment areas. The treatment areas for the different scenarios have been described. In addition to the size of the treated area, the size of the species home range or foraging range was used to calculate the AUF as follows:

$$\text{AUF} = \frac{\text{Foraging Range}}{\text{Treated Area}}$$

For species with a home range or foraging area smaller than the size of the treated area, all their food was assumed to be gathered from the treated area. For species with a home range larger than the size of the treated area, the proportion of diet containing pesticide residues were assumed to be comparable to the AUF. Long-term (chronic) exposures are reduced or diluted in such species because a portion of their diets are likely acquired off the application area. The estimates used for each species foraging range can be found in the Dashboard Database.

In the assessment of acute risk, the AUF was always set to 1.0. An animal could potentially spend a short time within a treated area and become acutely exposed shortly after an application. Therefore, no reduction in the acute exposure estimate was made based on the AUF. In the chronic assessment for terrestrial species, three exposure estimates were made. One exposure estimate used the calculated AUF based on the species' foraging or home range and the application area. A second estimate set the AUF to 1.0 to assess the potential situation where multiple adjacent applications might have been made to the entire home range. The third estimate used the midpoint between the estimated AUF and 1.0. For example, if the estimated AUF would have been 0.45, the Midpoint AUF would be 0.725. In the chronic assessment of aquatic species, the AUF was always 1.0 since aquatic species are restricted to their surface water bodies. By presenting a range of exposures estimated from different AUF (*i.e.*, no AUF, Midpoint AUF, and AUF), other species represented by the surrogate species that have similar diets, but a differing foraging range, were better included in the exposure estimates.

Given the large geographic scope of the Proposed Program, it was not possible to predict the number of treatment areas that might occur within a species home range. Assuming an AUF equal to 1.0 would likely be overly conservative but using the AUF based on the species' home range might not be sufficiently conservative. Inclusion of the Midpoint AUF was an attempt to capture this uncertainty. The Midpoint AUF also accounts for species with similar diets as a surrogate but that have a different foraging range. Therefore, both ends of this spectrum, as well as the midpoint, were developed and the full range of possibilities presented.

5 Effects Assessment

The effects assessment consists of an evaluation of available toxicity or other adverse effects information that can be used to relate the exposures to pesticides and adverse effects in ecological receptors. Toxicity is a property of a chemical, and the toxicity of a chemical alone does not indicate its potential to harm a given organism. A key to understanding the effects of a chemical on an organism is the dosage of the chemical that the organism receives or the concentration to which it is exposed. For example, certain substances are considered toxic (*e.g.*, caffeine), but are harmless in small dosages. Conversely, an ordinarily harmless substance (*e.g.*, water) can be lethal if over-consumed. This relationship between exposure and effect on an organism is called a dose-response effect and is discussed in Section 6: Risk Characterization. Data that can be used to define the toxicity of a chemical include literature-derived or site-specific single-chemical toxicity data, site-specific ambient-media toxicity tests, and site-specific field surveys (Suter, 2007). For this ERA, data were restricted to single-chemical toxicity data from literature sources because specific toxicity data for the mixtures of pesticides were not available.

In this ERA, numerical representation of the measurement effects for toxicity were reported as TRVs. An ecological TRV is similar to a human health reference dose (RfD). A TRV is an EEC expressed as an administered dose or as a media concentration used in conjunction with an environmental concentration to estimate health hazard or ecological risk (U.S. Army, 2000). The way in which TRVs are developed depends on available data of the chemical's toxicological effects and commonly accepted assumptions that address uncertainty regarding the available data. TRVs were developed using the same methods as described in the Statewide PEIR (CDFA, 2014a). TRVs for flupyradifurone and propylene carbonate can be found in the Dashboard Database. No relevant ecotoxicological data were available on which to base TRVs for oxirane, methyl-, polymer with oxirane, monobutyl ether, so no TRVs are included in the Dashboard Database for that inert ingredient. The results of the effects assessment (*i.e.* the TRVs) were combined with the exposure assessment to derive the risk characterization results in the final phase of the risk assessment process.

The USEPA (2017f) has developed acute toxicity categories for pesticides ranging from the most toxic category of 'very highly toxic' to the least toxic category of 'practically nontoxic' (**Table Eco-1**). These are strictly based on the results of laboratory acute toxicity tests. In some cases, a class of animals might show much higher sensitivity based on chronic toxicity. This classification only gives a description of the numerical toxicity property of the chemical and provides a means of comparing the potency among chemicals. It is not until it is combined with an EEC or EDD that adverse effects can be addressed. The detailed description of the toxicity classification from **Table Eco-1** is provided for each active or inert ingredient below.

Table Eco-1. Acute Ecotoxicity Categories for Terrestrial and Aquatic Organisms.

Toxicity Category	Avian: Acute Oral LD_{50} (mg/kg)	Aquatic Organisms: Acute LC_{50} (ppm)	Wild Mammals: Acute Oral LD_{50} (mg/kg)	Non-Target Insects: Acute LD_{50} (µg/bee)
very highly toxic	<10	<0.1	<10	--
highly toxic	10-50	0.1 - 1	10 - 50	<2
moderately toxic	51-500	>1 - 10	51 - 500	2 - 11
slightly toxic	501-2000	>10 - 100	501 - 2000	--
practically nontoxic	>2000	>100	>2000	>11

Source: USEPA 2017f

5.1 Flupyradifurone

The active ingredient in Altus is flupyradifurone. Flupyradifurone is slightly toxic to aquatic-phase amphibians. Flupyradifurone is highly toxic to slightly toxic to freshwater aquatic invertebrates and highly to slightly toxic to estuarine/marine aquatic invertebrate species. Flupyradifurone is slightly toxic to freshwater fish and estuarine/marine fish species.

No toxicity information was available for terrestrial-phase amphibians or reptiles. The toxicity of flupyradifurone to terrestrial-phase amphibians and reptiles was considered similar to that in birds (USEPA, 2004j). Flupyradifurone is moderately toxic to birds, but practically nontoxic to

mammals based on acute toxicity. However, mammals show considerable sensitivity to flupyradifurone based on reproductive toxicity. Flupyradifurone is highly toxic to bees via oral exposure but practically nontoxic via contact exposure.

5.2 Propylene Carbonate

One of the inert ingredients in Altus is propylene carbonate. Propylene carbonate is practically nontoxic to freshwater aquatic invertebrates. Propylene carbonate is moderately toxic to freshwater fish. Propylene carbonate is practically nontoxic to mammals. No other ecotoxicological data were available.

5.3 Oxirane Polymer

No ecotoxicological data were available.

6 Risk Characterization

Risk characterization is the final phase in the risk assessment process. The purpose of the risk characterization phase is to integrate the two aspects of the analysis phase: exposure and effects assessments. In the risk characterization, exposure and effects data are integrated to allows for conclusions concerning the presence, nature, and magnitude of effects that may exist under the application scenarios. This includes both quantitative and qualitative assessments to properly characterize the complete risk assessment outcome. The quantitative assessment is based on a comparison of the numerical value from combining exposure and effects – the RQ – against a target value – the Level of Concern (LOC). For scenarios that have RQs below the LOC, a conclusion is appropriate for a low potential for adverse effects from implementation of the scenario. This conclusion is due to the conservative assumptions that were consistently used throughout the risk assessment process. For situations where the RQ exceeds the LOC, a qualitative analysis of the potential for adverse effects under the application scenario incorporates information that cannot be included in the quantitative analysis. The exceedance of an RQ alone is not sufficient to indicate a presumption that adverse effects are likely.

In ecological risk assessments for pesticides, EECs or EDDs determined in Section 4: Exposure Assessment are compared to TRVs developed in Section 5: Effects Assessment to calculate an RQ (USEPA, 2004j).

$$RQ = \frac{\text{EEC or EDD}}{\text{TRV}}$$

Where:
RQ = Risk Quotient (unitless)
EEC = Estimated Environmental Concentration (mg dw/kg or µg/L)
EDD = Estimated Daily Dose (mg/kg bw-day)
TRV = Toxicity Reference Value (mg/kg bw-day or µg/L)

When the RQ is equal to or exceeds an LOC of 1.0, a potential risk is presumed to exist for the non-threatened or non-endangered ecological receptor being assessed. For listed threatened or

endangered (T&E) species, the LOC is reduced to 0.5, to represent the heightened concern for these species; this LOC is referred to as the T&E LOC. It is important to remember that whenever an RQ exceeds the standard LOC of 1.0, suggesting exposures to non-T&E species might be harmful, the lower T&E LOC providing additional protection to special-status species is necessarily exceeded.

RQs for both acute and chronic risk were calculated in the same manner using the appropriate acute or chronic EEC or EDD paired with appropriate acute or chronic TRV. When all pesticide active and inert ingredients were assessed individually, the RQs for all chemicals present were assumed to be additive and thus totaled together to determine the total RQ. The total RQ was then compared to the applicable LOC. The risk analysis focused on whether the total RQs from all ingredients in the Altus could exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5.

For those application scenarios that had RQs above the applicable LOC, a qualitative assessment was conducted. Several common qualitative assessments were utilized, and the discussion below presents the rationale forming the basis of these qualitative assessments. It also includes specific measures that can be implemented to decrease the potential for adverse effects. This logic is referred to for specific application scenarios later in this section, but the full rationale presented here.

6.1 Potential for a Species to Be Present at the Application Site

One of the first qualitative attributes to consider is the likelihood of the specific species being present at a particular application site. This ERA was conducted assuming all species would be present at an application site. This is clearly not likely as species exist in particular habitats and not all habitats can occur at a single application site. For instance, if the application site does not contain suitable foraging habitat for a particular species, that species is relatively unlikely to come into the area and be exposed to pesticides by ingestion. Pollinating species are less likely to be present if no plants in bloom are present. Some locations are unlikely to have any species present, such as the loading dock area of a nursery. Marine/estuarine species would be absent if the application site is not near the coastline.

CDFA's standard practice prior to implementing any pesticide application scenario is to identify whether any special-status species habitat is nearby, and if so, identify appropriate measures to avoid adversely affecting the species. As part of this, CDFA obtains technical assistance from California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), and/or United States Fish and Wildlife Service (USFWS). Examples of these measures include:

- Conduct application at times when the species is unlikely to be present.
- Ensure an adequate buffer distance is maintained as well as shields, tarps, sandbags, or trenching used in urban/residential settings to minimize the concentrations of pesticides that reach surrounding habitat by drift or run-off.
- Spray pots on impermeable surfaces to prevent leaching pesticides to native soil.

- Conduct BeeChecks and applicable notifications through the BeeWhere program (https://beewherecalifornia.com) to locate nearby honey bee colonies.
  Advanced notice is **mandatory** under 3 CCR § 6654(a):
  "*Each person intending to apply any pesticide toxic to bees to a blossoming plant shall, prior to the application, inquire of the commissioner, or of a notification service designated by the commissioner, whether any beekeeper with apiaries within one mile of the application site has requested notice of such application.*"

With implementation of this standard practice, the potential for adverse effects on species as a result of Proposed Program pesticides applications would be low.

6.2 Foraging Diet

The extent to which a particular species consumes food from the application area will greatly influence their exposure. Different species forage over vastly different areas. The analysis presented three different assumptions for the percentage of foraging range that would be within the application area. This was done to show the range of variabilities that may occur depending on the extent to which a particular species consumes vegetation or other organisms from within the application area. Species with large foraging areas are unlikely to consume all their diet from within an application area. Foraging range is typically related to availability of food resources, so most species with similar diets have similar foraging ranges. Long-term (chronic) exposures are reduced or diluted in such species because a portion of their diets are likely acquired off the application area. Refer to the discussion of AUFs in Section 4.3: Oral Ingestion Exposure Calculations.

6.3 Dilution and Degradation of Chemicals

Through time, the concentration of pesticides generally decrease following an application. The models used in the quantitative risk assessment have limited capabilities to fully incorporate the numerous fate mechanisms which cause the pesticides to dissipate in the environment. Thus, in many instances, the concentrations that would likely occur would be less than the values modeled in the quantitative risk assessment. In the case of chronic exposures, the concentrations would be considerably lower than estimated. This applies in particular to soil and water concentrations as well as those estimated concentrations related to uptake from either soil or water. In addition to overestimation of concentrations due to chemical breakdown, dilution (or reduction in concentration when mixed) will occur when the pesticide residues combine with environmental media that is not contaminated. For instance, during a rain event that assists in transporting pesticide residue from foliage and soil to a waterbody, additional, uncontaminated water will add to the volume of water in the waterbody itself. This also applies to water concentrations as the pesticides continue to move from various waterbodies, such as drainage ditches, streams, and rivers. Due to dilution and low probability of application scenarios being adjacent to a marine/estuarine waterbody, the potential for elevated concentrations in marine/estuarine waterbodies would be relatively low, and the potential for adverse effects to marine/estuarine species would be correspondingly low.

It is CDFA's practice to ensure measures are taken to prevent pesticide applications from directly reaching a waterbody. CDFA's protection measures for surface waters were presented in Section 2.11: Program Management Practices of the Main Body of the Statewide PEIR (CDFA, 2014a). Where necessary, site-specific conditions might need to be assessed and additional precautions applied to prevent drift or movement to water or sensitive habitats. Indirect pathways would likely have lower concentrations than predicted by the quantitative model. Therefore, the actual risk to aquatic organisms would be lower than predicted. Specific BMPs are required for specific applications conducted by CDFA under their Spray Applications National Pollutant Discharge Elimination System (NPDES) permit. Such BMPs for ground applications include a preapplication site assessment, proper calibration and maintenance of spray equipment, making applications only during favorable weather, using low pressure application equipment, and conducting spot applications (*i.e.*, limit application areas). For aerial applications, a standard 200-m buffer is maintained around water bodies.

6.4 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications Urban/Residential Setting using Altus (PDCP-79)

The risk analysis focused on whether the RQs resulting from foliar applications of Altus in urban/residential settings exceeded the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5, which provided additional protection to special-status species. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC is necessarily exceeded as well. The potential for risk from inert ingredients in Altus was included in this analysis and analyses for the remaining scenarios.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Altus for the control of GWSS would be made to host plants in urban/residential areas. Applications would be made once per year to roughly a third of the 17.5-acre area surrounding where a GWSS was found. Additionally, as described in Section 2.10.2: Technical Assistance from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing buffers or other suitable measures.

In the PDCP, Altus applied as a foliar spray (PDCP-79) treatment to the host plants in an urban/residential setting once per year was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-2** presents the acute RQs and **Tables Eco-3** through **Eco-5** present chronic RQs associated with scenario PDCP-79 when foliar applications are made for the control of GWSS. Chronic RQs for fully aquatic species appear only in **Table Eco-5** since no AUFs were considered for aquatic species. No acute TRVs were available for larval honey bees, so larval honey bees are not included in **Table Eco-2**. Chronic TRVs do not exist for terrestrial insects other than adult and larval honey bees. So, the only terrestrial insects that appear in **Tables Eco-3** through **Eco-5** are the adult and larval honey bee. Those RQs that exceeded the standard LOC of 1.0 appear as bold text, whereas those RQs that exceeded both the T&E LOC of 0.5 appear in bold italics.

6.4.1 Risk to Amphibians

No acute or chronic RQs for aquatic- or terrestrial-phase amphibians exceeded LOCs following applications of Altus in an urban/residential setting. Therefore, foliar uses of Altus in an urban/residential setting is not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

6.4.2 Risk to Aquatic Invertebrates

Foliar applications of Altus in an urban/residential setting did not result in acute or chronic RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Therefore, the potential for adverse effects is thought to be low for aquatic invertebrates following applications of Altus in an urban/residential setting.

6.4.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, use of Altus as a foliar treatment in an urban/residential setting is not thought likely to be harmful for fish.

6.4.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, use of Altus as a foliar treatment in an urban/residential setting is not thought likely to be harmful for reptiles.

6.4.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, use of Altus as a foliar treatment in an urban/residential setting is not thought likely to be harmful for birds.

6.4.6 Risk to Mammals

Foliar applications of Altus in the urban/residential setting did not result in acute RQs that exceed the standard or T&E LOCs for any mammal surrogate species. Foliar applications of Altus resulted in chronic RQs that exceeded the standard LOC for the terrestrial riparian brush rabbit and southern grasshopper mouse and the T&E LOC for Nelson's antelope squirrel when exposure was estimated incorporating the AUF. Foliar applications of Altus also resulted in chronic RQs that exceeded LOCs for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel for Midpoint AUF or No AUF exposure estimates.

Riparian brush rabbits have diets that focus entirely on mixed terrestrial vegetation, and big free-tailed bats have diets consisting entirely of terrestrial insects. Southern grasshopper mouse and Nelson's antelope squirrel have mixed diets consisting mostly of terrestrial vegetation and insects. No mammal surrogate species that forage in aquatic habitats had RQs that exceeded LOCs. Implementing a 25-ft. buffer to foraging habitat sufficiently reduces exposure from residues in/on vegetation and insects so no surrogate species had chronic RQs that exceeded LOCs.

6.4.7 Risk to Earthworms

The acute or chronic RQs for earthworms did not exceed any LOCs. Therefore, use of Altus as a foliar treatment is not thought likely to be harmful for soil-dwelling invertebrates.

6.4.8 Risk to Terrestrial Insects

When Altus is applied as a foliar application in urban/residential settings under PDCP-79, adult honey bees and Blennosperma vernal pool andrenid bees exposed via consumption of pollen or nectar, but not via direct contact, had acute RQs that exceeded LOCs. Chronic RQs for larval honey bees exceeded LOCs only when Midpoint AUF and No AUF exposure estimates were used. Since it is not possible to determine a proportion of flowering plants that might be treated, the worst-case scenario that all flowering plants are treated was used to estimate exposure. Incorporation of CDFA's BMPs to avoid applications to flowering plants and pollinator habitat should result in few if any treated flowering plants being available as forage for pollinators. Since few, if any, flowering plants would be treated, the estimated exposure was assumed to be exaggerated. In areas flowering plants exist, those flowering plants must not be directly sprayed.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a 25-ft. buffer from the application site to foraging habitat or other site-specific measures as well as adherence to the more recent BeeWhere program discussed earlier would sufficiently reduce exposure and acute or chronic RQs would not be expected to exceed LOCs. In areas where a 25-ft. buffer might be impractical, plants currently in bloom must not be directly sprayed.

Table Eco-2. Potential risk associated with Application Scenario PDCP-79 following acute exposure—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 1 application per year in an urban/residential setting (17.5 Acres).

Table Eco-2a. PDCP-79 Acute Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00
aquatic California red-legged frog	0.00	0.00
terrestrial California red-legged frog	0.00	0.00
aquatic western spadefoot	0.00	0.00
vernal pool fairy shrimp	0.02	0.02
Tomales isopod	0.02	0.02
Sacramento splittail	0.00	0.00
desert pupfish	0.00	0.00
giant garter snake	0.00	0.00
western pond turtle	0.00	0.00
tricolored blackbird	0.05	0.00
fulvous whistling-duck	0.00	0.00
yellow rail	0.10	0.00

Table Eco-2b. PDCP-79 Acute Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00
aquatic southern torrent salamander	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00
California freshwater shrimp	0.02	0.02
Shasta crayfish	0.02	0.02
arroyo chub	0.00	0.00
coastal cutthroat trout	0.00	0.00
Chinook salmon	0.00	0.00
Osprey	0.00	0.00
southwestern river otter	0.00	0.00

Table Eco-2c. PDCP-79 Acute Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00
tidewater goby	0.00	0.00
delta smelt	0.00	0.00

Table Eco-2d. PDCP-79 Acute Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00
East Pacific green sea turtle	0.00	0.00
California brown pelican	0.00	0.00
southern sea otter	0.00	0.00

Table Eco-2e. PDCP-79 Acute Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00
terrestrial arroyo toad	0.01	0.00
terrestrial western spadefoot	0.01	0.00
Alameda whipsnake	0.00	0.00
northern red diamond rattlesnake	0.00	0.00
desert tortoise	0.01	0.00
western fence lizard	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00
mourning dove	0.01	0.00
California condor	0.01	0.00
white-tailed kite	0.02	0.00
Cooper's hawk	0.01	0.00
western yellow-billed cuckoo	0.20	0.00
purple martin	0.12	0.00
mule deer	0.01	0.00
riparian brush rabbit	0.04	0.00
American badger	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00
big free-tailed bat	0.04	0.00
southern grasshopper mouse	0.03	0.00
Nelson's antelope squirrel	0.03	0.00
Earthworm	0.00	0.00
honey bee-adult (contact)	0.01	0.00
honey bee-adult (oral)	**9.14**	0.08
Blennosperma vernal pool andrenid bee (contact)	0.01	0.00
Blennosperma vernal pool andrenid bee (oral)	**9.14**	0.08
San Joaquin tiger beetle (contact)	0.01	0.00

Table Eco-3. Potential risk associated with Application Scenario PDCP-79 following chronic exposure with full AUF—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 1 application per year in an urban/residential setting (17.5 Acres).

Table Eco-3a. PDCP-79 Chronic Full AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00
giant garter snake	0.00	0.00
western pond turtle	0.00	0.00
tricolored blackbird	0.00	0.00
fulvous whistling-duck	0.00	0.00
yellow rail	0.05	0.00

Table Eco-3b. PDCP-79 Chronic Full AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00
Osprey	0.00	0.00
southwestern river otter	0.00	0.00

Table Eco-3c. PDCP-79 Chronic Full AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00
California brown pelican	0.00	0.00
southern sea otter	0.00	0.00

Table Eco-3d. PDCP-79 Chronic Full AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00
terrestrial arroyo toad	0.01	0.00
terrestrial western spadefoot	0.01	0.00
Alameda whipsnake	0.00	0.00
northern red diamond rattlesnake	0.00	0.00
desert tortoise	0.00	0.00
western fence lizard	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00
mourning dove	0.01	0.00
California condor	0.00	0.00
white-tailed kite	0.00	0.00
Cooper's hawk	0.00	0.00
western yellow-billed cuckoo	0.10	0.00
purple martin	0.03	0.00
mule deer	0.01	0.00
riparian brush rabbit	**1.30**	0.01
American badger	0.00	0.00
northwestern San Diego pocket mouse	0.10	0.00
big free-tailed bat	0.00	0.00
southern grasshopper mouse	**1.05**	0.01
Nelson's antelope squirrel	***0.85***	0.01
Earthworm	0.01	0.00
honey bee-adult (oral)	0.00	0.00
Honey bee-larvae	0.01	0.00

Table Eco-4. Potential risk associated with Application Scenario PDCP-79 following chronic exposure with Midpoint AUF—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 1 application per year in an urban/residential setting (17.5 Acres).

Table Eco-4a. PDCP-79 Chronic Midpoint AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00
western pond turtle	0.00	0.00
tricolored blackbird	0.04	0.00
fulvous whistling-duck	0.00	0.00
yellow rail	0.05	0.00

Table Eco-4b. PDCP-79 Chronic Midpoint AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00
Osprey	0.00	0.00
southwestern river otter	0.00	0.00

Table Eco-4c. PDCP-79 Chronic Midpoint AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00
California brown pelican	0.00	0.00
southern sea otter	0.00	0.00

Table Eco-4d. PDCP-79 Chronic Midpoint AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00
terrestrial arroyo toad	0.01	0.00
terrestrial western spadefoot	0.01	0.00
Alameda whipsnake	0.00	0.00
northern red diamond rattlesnake	0.00	0.00
desert tortoise	0.01	0.00
western fence lizard	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00
mourning dove	0.01	0.00
California condor	0.00	0.00
white-tailed kite	0.00	0.00
Cooper's hawk	0.00	0.00
western yellow-billed cuckoo	0.19	0.00
purple martin	0.10	0.00
mule deer	0.11	0.00
riparian brush rabbit	**1.30**	0.01
American badger	0.02	0.00
northwestern San Diego pocket mouse	0.10	0.00
big free-tailed bat	***0.59***	0.00
southern grasshopper mouse	**1.05**	0.01
Nelson's antelope squirrel	***0.89***	0.01
Earthworm	0.01	0.00
honey bee-adult (oral)	0.42	0.00
Honey bee-larvae	**1.88**	0.02

Table Eco-5. Potential risk associated with Application Scenario PDCP-79 following chronic exposure with no AUF—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 1 application per year in an urban/residential setting (17.5 Acres).

Table Eco-5a. PDCP-79 Chronic No AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00
aquatic California red-legged frog	0.00	0.00
terrestrial California red-legged frog	0.00	0.00
aquatic western spadefoot	0.00	0.00
vernal pool fairy shrimp	0.02	0.02
Tomales isopod	0.02	0.02
Sacramento splittail	0.00	0.00
desert pupfish	0.00	0.00
giant garter snake	0.00	0.00
western pond turtle	0.00	0.00
tricolored blackbird	0.08	0.00
fulvous whistling-duck	0.00	0.00
yellow rail	0.05	0.00

Table Eco-5b. PDCP-79 Chronic No AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00
aquatic southern torrent salamander	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00
California freshwater shrimp	0.02	0.02
Shasta crayfish	0.02	0.02
arroyo chub	0.00	0.00
coastal cutthroat trout	0.00	0.00
Chinook salmon	0.00	0.00
Osprey	0.00	0.00
southwestern river otter	0.00	0.00

Table Eco-5c. PDCP-79 Chronic No AUF Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00
tidewater goby	0.00	0.00
delta smelt	0.00	0.00

Table Eco-5d. PDCP-79 Chronic No AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00
East Pacific green sea turtle	0.00	0.00
California brown pelican	0.00	0.00
southern sea otter	0.00	0.00

Table Eco-5e. PDCP-79 Chronic No AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00
terrestrial arroyo toad	0.01	0.00
terrestrial western spadefoot	0.01	0.00
Alameda whipsnake	0.00	0.00
northern red diamond rattlesnake	0.00	0.00
desert tortoise	0.01	0.00
western fence lizard	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00
mourning dove	0.01	0.00
California condor	0.00	0.00
white-tailed kite	0.00	0.00
Cooper's hawk	0.00	0.00
western yellow-billed cuckoo	0.29	0.00
purple martin	0.18	0.00
mule deer	0.22	0.00
riparian brush rabbit	**1.30**	0.01
American badger	0.03	0.00
northwestern San Diego pocket mouse	0.10	0.00
big free-tailed bat	**1.19**	0.01
southern grasshopper mouse	**1.05**	0.01
Nelson's antelope squirrel	***0.93***	0.01
Earthworm	0.01	0.00
honey bee-adult (oral)	***0.83***	0.01
Honey bee-larvae	**3.75**	0.03

6.5 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications in Nursery Loading Docks using Altus (PDCP-80)

The risk analysis focused on whether the RQs resulting from foliar applications of Altus applied on nursery loading docks exceed the standard or T&E LOC. Foliar applications of Altus for the control of GWSS would be made to containerized nursery stock while on the loading dock prior to shipment. Deposition to the loading dock surface beneath the containerized nursery stock is possible. Applications would be made up to 150 times per year at 2-day intervals on a nursery loading dock. Additionally, as described in Section 2.10.2: Technical Assistance from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing buffers or other suitable measures.

In the PDCP, Altus (PDCP-80) applied as a foliar treatment on a nursery loading dock at 2-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-6** presents the acute RQs and **Tables Eco-7** through **Eco-9** present chronic RQs associated with scenario PDCP-80. Chronic RQs for fully aquatic species appear only in **Table Eco-9** since no AUFs were considered for aquatic species. No acute TRVs were available for larval honey

bees, so larval honey bees are not included in **Table Eco-5**. Chronic TRVs do not exist for terrestrial insects other than adult and larval honey bees. So, the only terrestrial insects that appear in **Tables Eco-7** through **Eco-9** are the adult and larval honey bee. Those RQs that exceeded the standard LOC of 1.0 appear as bold text, whereas those RQs that exceeded the T&E LOC of 0.5 appear in bold italics.

6.5.1 Risk to Amphibians

No acute or chronic RQs for aquatic- or terrestrial-phase amphibians exceeded LOCs following applications of Altus on nursery loading docks. Therefore, foliar use of Altus on nursery loading docks is not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

6.5.2 Risk to Aquatic Invertebrates

Foliar applications of Altus resulted in acute and chronic RQs that exceeded T&E LOCs for freshwater pool-dwelling vernal pool fairy shrimp and Tomales isopod, and freshwater riverine California freshwater shrimp and Shasta crayfish. No acute or chronic RQs exceeded LOCs for any estuarine or marine invertebrates. Exposure estimates were reduced by decreasing the number of applications to only 100 or 50 per year (one or two per week) or assuming restrictions are in place to prevent residues reaching surface waters. Reducing the number of applications to 50 per year, but not 100 per year, was sufficient to reduce the acute or chronic exposure such that RQs did not exceed LOCs. The peak water concentration, regardless of when it occurred within the series of applications, was used to assess acute risk. Since a decrease in the number of applications eliminated exceedances of LOCs, sufficient degradation occurs between applications when only 50 applications per year, or one application per week, to prevent water concentrations from accumulating to harmful concentrations. Therefore, foliar use of Altus on nursery loading docks is not thought likely to be harmful for freshwater pool-dwelling or freshwater riverine invertebrates when applications are limited to one per week, or conditions exist to prevent residues reaching surface water if up to 150 applications per year are made. Up to 150 applications per year (three applications per week) are not likely to be harmful to estuarine or marine invertebrates.

6.5.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, use of Altus as a foliar treatment on nursery loading docks is not thought likely to be harmful for fish.

6.5.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, use of Altus as a foliar treatment on nursery loading docks is not thought likely to be harmful for reptiles.

6.5.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, use of Altus as a foliar treatment on nursery loading docks is not thought likely to be harmful for birds.

6.5.6 Risk to Mammals

Foliar applications of Altus on nursery loading docks did not result in acute RQs that exceeded the standard or T&E LOCs for any mammal surrogate species. Foliar applications of Altus only resulted in chronic RQs that exceeded LOCs for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel for Midpoint AUF or No AUF exposure estimates. As discussed previously, riparian brush rabbits have diets that focus entirely on mixed terrestrial vegetation, and big free-tailed bats have diets consisting entirely of terrestrial insects. Southern grasshopper mouse and Nelson's antelope squirrel have mixed diets consisting mostly of terrestrial vegetation and insects. No mammal surrogate species that forage in aquatic habitats had RQs that exceeded LOCs.

Decreasing the number of applications to only one or two per week was not sufficient to reduce the available concentrations such that RQs based on the Midpoint AUF or No AUF were less than LOCs. Implementing a 25-ft. buffer to foraging habitat for all surrogate species based on RQs for Midpoint AUFs but not for RQs based on No AUF was necessary so chronic RQs were less than LOCs. The small size of the nursery loading dock and its lack of natural habitat features makes it unlikely that mammals with insect or plant-based diets will acquire a greater than anticipated proportion of their diets from treated nursery loading docks or areas within approximately 25 ft. of the loading dock. Therefore, it can be concluded that the potential for adverse effects for terrestrial foraging mammals is low.

6.5.7 Risk to Earthworms

The acute and chronic RQs for earthworms did not exceed any LOCs. Therefore, use of Altus as a foliar treatment has little potential to cause acute or chronic adverse effects for soil-dwelling invertebrates on or near nursery loading docks.

6.5.8 Risk to Terrestrial Insects

When Altus is applied as a foliar application on nursery loading docks under PDCP-80, adult honey bees and Blennosperma vernal pool andrenid bees exposed via consumption of pollen or nectar, but not via direct contact, had acute RQs that exceeded LOCs. Chronic RQs for larval honey bees exceeded LOCs when Midpoint AUF exposure estimates were used, and chronic RQs exceeded LOCs for adult and larval honey bees when No AUF exposure estimates were used. Although it is unlikely that flowering plants might be treated on a nursery loading dock, the worst-case scenario that all flowering plants are treated was used to estimate exposure. Incorporation of CDFA's BMPs to avoid applications to flowering plants and pollinator habitat should result in few if any treated flowering plants being available as forage for pollinators. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated. In areas flowering plants exist, those flowering plants must not be directly sprayed.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of BMPs and other site-specific measures as well as adherence to the more recent BeeWhere program discussed earlier are anticipated to sufficiently reduce exposure and chronic RQs would be less than LOCs.

Table Eco-6. Potential risk associated with Application Scenario PDCP-80 following acute exposure—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 150 applications per year on a nursery loading dock (3750 sq. ft.).
Table Eco-6a. PDCP-80 Acute Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	***0.87***	***0.87***	0.00	***0.58***	0.29
Tomales isopod	***0.87***	***0.87***	0.00	***0.58***	0.29
Sacramento splittail	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.10	0.07	0.05	0.08	0.07
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00
yellow rail	0.18	0.13	0.10	0.16	0.13

Table Eco-6b. PDCP-80 Acute Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.01	0.01	0.00	0.01	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.01	0.01	0.01	0.01
California freshwater shrimp	***0.87***	***0.87***	0.00	***0.58***	0.29
Shasta crayfish	***0.87***	***0.87***	0.00	***0.58***	0.29
arroyo chub	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00
Osprey	0.05	0.05	0.00	0.03	0.02
southwestern river otter	0.00	0.00	0.00	0.00	0.00

Table Eco-6c. PDCP-80 Acute Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
mimic tryonia	0.08	0.08	0.00	0.05	0.03
tidewater goby	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00

Table Eco-6d. PDCP-80 Acute Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
black abalone	0.08	0.08	0.00	0.05	0.03
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.06	0.06	0.00	0.04	0.02
southern sea otter	0.00	0.00	0.00	0.00	0.00

Table Eco-6e. PDCP-80 Acute Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California tiger salamander	0.01	0.00	0.01	0.01	0.01
terrestrial arroyo toad	0.01	0.01	0.01	0.01	0.01
terrestrial western spadefoot	0.01	0.01	0.01	0.01	0.01
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.01	0.01	0.01	0.01
western fence lizard	0.02	0.01	0.02	0.02	0.02
blunt-nosed leopard lizard	0.02	0.01	0.02	0.02	0.02
mourning dove	0.01	0.00	0.01	0.01	0.01
California condor	0.01	0.00	0.01	0.01	0.01
white-tailed kite	0.02	0.01	0.02	0.02	0.02
Cooper's hawk	0.01	0.01	0.01	0.01	0.01
western yellow-billed cuckoo	0.20	0.09	0.20	0.20	0.20
purple martin	0.20	0.13	0.12	0.17	0.14
mule deer	0.01	0.00	0.01	0.01	0.01
riparian brush rabbit	0.04	0.01	0.04	0.04	0.04
American badger	0.00	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00	0.00
big free-tailed bat	0.04	0.01	0.04	0.04	0.04
southern grasshopper mouse	0.03	0.01	0.03	0.03	0.03
Nelson's antelope squirrel	0.03	0.01	0.03	0.03	0.03
earthworm	0.00	0.00	0.00	0.00	0.00
honey bee-adult (contact)	0.01	0.00	0.01	0.01	0.01
honey bee-adult (oral)	**9.14**	**4.36**	**9.14**	**9.14**	**9.14**
Blennosperma vernal pool andrenid bee (contact)	0.01	0.00	0.01	0.01	0.01
Blennosperma vernal pool andrenid bee (oral)	**9.14**	**4.36**	**9.14**	**9.14**	**9.14**
San Joaquin tiger beetle (contact)	0.01	0.00	0.01	0.01	0.01

Table Eco-7. Potential risk associated with Application Scenario PDCP-80 following chronic exposure with full AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 150 applications per year on a nursery loading dock (3750 sq. ft.).

Table Eco-7a. PDCP-80 Chronic Full AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.00	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00
yellow rail	0.00	0.00	0.00	0.00	0.00

Table Eco-7b. PDCP-80 Chronic Full AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.01	0.01	0.01	0.01
osprey	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00	0.00

Table Eco-7c. PDCP-80 Chronic Full AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00	0.00

Table Eco-7d. PDCP-80 Chronic Full AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California tiger salamander	0.00	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.01	0.01
terrestrial western spadefoot	0.00	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.00	0.00	0.00
western fence lizard	0.02	0.01	0.02	0.02	0.02
blunt-nosed leopard lizard	0.00	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.00	0.00	0.00	0.00	0.00
purple martin	0.00	0.00	0.00	0.00	0.00
mule deer	0.00	0.00	0.00	0.00	0.00
riparian brush rabbit	0.05	0.02	0.05	0.05	0.05
American badger	0.00	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.01	0.01	0.01	0.01
big free-tailed bat	0.00	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.02	0.01	0.02	0.02	0.02
Nelson's antelope squirrel	0.00	0.00	0.00	0.00	0.00
earthworm	0.00	0.01	0.00	0.00	0.00
honey bee-adult (oral)	0.00	0.00	0.00	0.00	0.00
Honey bee-larvae	0.00	0.00	0.00	0.00	0.00

Table Eco-8. Potential risk associated with Application Scenario PDCP-80 following chronic exposure with Midpoint AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 150 applications per year on a nursery loading dock (3750 sq. ft.).

Table Eco-8a. PDCP-80 Chronic Midpoint AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.08	0.06	0.04	0.07	0.05
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00
yellow rail	0.05	0.04	0.03	0.04	0.04

Table Eco-8b. PDCP-80 Chronic Midpoint AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial southern torrent salamander	0.01	0.01	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.01	0.01	0.01	0.01
Osprey	0.03	0.03	0.00	0.02	0.01
southwestern river otter	0.09	0.09	0.00	0.06	0.03

Table Eco-8c. PDCP-80 Chronic Midpoint AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.02	0.02	0.00	0.01	0.01
southern sea otter	0.06	0.06	0.00	0.04	0.02

Table Eco-8d. PDCP-80 Chronic Midpoint AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California tiger salamander	0.01	0.00	0.01	0.01	0.01
terrestrial arroyo toad	0.01	0.00	0.01	0.01	0.01
terrestrial western spadefoot	0.01	0.00	0.01	0.01	0.01
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.01	0.01	0.01
western fence lizard	0.02	0.01	0.02	0.02	0.02
blunt-nosed leopard lizard	0.01	0.01	0.01	0.01	0.01
mourning dove	0.00	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.16	0.08	0.16	0.16	0.16
purple martin	0.16	0.11	0.10	0.14	0.12
mule deer	0.12	0.06	0.12	0.12	0.12
riparian brush rabbit	***0.76***	0.36	***0.76***	***0.76***	***0.76***
American badger	0.02	0.01	0.02	0.02	0.02
northwestern San Diego pocket mouse	0.07	0.03	0.07	0.07	0.07
big free-tailed bat	***0.68***	0.32	***0.68***	***0.68***	***0.68***
southern grasshopper mouse	***0.60***	0.28	***0.60***	***0.60***	***0.60***
Nelson's antelope squirrel	***0.53***	0.25	***0.53***	***0.53***	***0.53***
Earthworm	0.00	0.01	0.00	0.00	0.00
honey bee-adult (oral)	0.47	0.22	0.47	0.47	0.47
Honey bee-larvae	**2.12**	**1.00**	**2.12**	**2.12**	**2.12**

Table Eco-9. Potential risk associated with Application Scenario PDCP-80 following chronic exposure with no AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 150 applications per year on a nursery loading dock (3750 sq. ft.).
Table Eco-9a. PDCP-80 Chronic No AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
aquatic California tiger salamander	0.03	0.03	0.00	0.02	0.01
aquatic California red-legged frog	0.03	0.03	0.00	0.02	0.01
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.03	0.03	0.00	0.02	0.01
vernal pool fairy shrimp	***0.82***	***0.82***	0.00	***0.55***	0.27
Tomales isopod	***0.82***	***0.82***	0.00	***0.55***	0.27
Sacramento splittail	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.16	0.11	0.08	0.13	0.11
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00
yellow rail	0.10	0.07	0.06	0.09	0.07

Table Eco-9b. PDCP-80 Chronic No AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
aquatic arroyo toad	0.03	0.03	0.00	0.02	0.01
aquatic southern torrent salamander	0.03	0.03	0.00	0.02	0.01
terrestrial southern torrent salamander	0.01	0.01	0.00	0.01	0.00
aquatic foothill yellow-legged frog	0.03	0.03	0.00	0.02	0.01
terrestrial foothill yellow-legged frog	0.01	0.01	0.01	0.01	0.01
California freshwater shrimp	***0.82***	***0.82***	0.00	***0.55***	0.27
Shasta crayfish	***0.82***	***0.82***	0.00	***0.55***	0.27
arroyo chub	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.03	0.03	0.00	0.02	0.01
Chinook salmon	0.03	0.03	0.00	0.02	0.01
Osprey	0.06	0.06	0.00	0.04	0.02
southwestern river otter	0.18	0.18	0.00	0.12	0.06

Table Eco-9c. PDCP-80 Chronic No AUF Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
mimic tryonia	0.01	0.01	0.00	0.01	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00

Table Eco-9d. PDCP-80 Chronic No AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
black abalone	0.01	0.01	0.00	0.01	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.03	0.03	0.00	0.02	0.01
southern sea otter	0.13	0.13	0.00	0.08	0.04

Table Eco-9e. PDCP-80 Chronic No AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- Loading Dock 100 apps/yr, 3d RTI	Reduced Exp.- Loading Dock 50 apps/yr, 6d RTI
terrestrial California tiger salamander	0.01	0.01	0.01	0.01	0.01
terrestrial arroyo toad	0.01	0.01	0.01	0.01	0.01
terrestrial western spadefoot	0.01	0.01	0.01	0.01	0.01
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.01	0.02	0.02	0.02
western fence lizard	0.02	0.01	0.02	0.02	0.02
blunt-nosed leopard lizard	0.02	0.01	0.02	0.02	0.02
mourning dove	0.01	0.00	0.01	0.01	0.01
California condor	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.32	0.15	0.32	0.32	0.32
purple martin	0.32	0.22	0.20	0.28	0.24
mule deer	0.25	0.12	0.25	0.25	0.25
riparian brush rabbit	**1.47**	***0.69***	**1.47**	**1.47**	**1.47**
American badger	0.04	0.02	0.04	0.04	0.04
northwestern San Diego pocket mouse	0.12	0.06	0.12	0.12	0.12
big free-tailed bat	**1.35**	***0.63***	**1.35**	**1.35**	**1.35**
southern grasshopper mouse	**1.19**	***0.56***	**1.19**	**1.19**	**1.19**
Nelson's antelope squirrel	**1.05**	0.49	**1.05**	**1.05**	**1.05**
earthworm	0.00	0.01	0.00	0.00	0.00
honey bee-adult (oral)	***0.95***	0.44	***0.95***	***0.95***	***0.95***
Honey bee-larvae	**4.25**	**2.00**	**4.25**	**4.25**	**4.25**

6.6 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications in Nursery Production Areas using Altus (PDCP-81)

The risk analysis focused on whether the RQs resulting from foliar applications of Altus to individual blocks of plants in nursery production areas exceed the standard or T&E LOC. Foliar applications of Altus for the control of GWSS would be made to containerized nursery stock while maintained in nursery production areas. Deposition to the nursery production area soil beneath the containerized nursery stock is possible. Applications would be made up to 2 times per year at 90-day intervals in a nursery production area. Additionally, as described in Section 2.10.2: Technical Assistance from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing buffers or other suitable measures.

In the PDCP, Altus (PDCP-81) applied as a foliar treatment to 0.75-acre blocks in nursery production areas at 90-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-10** presents the acute RQs and **Tables Eco-11** through **Eco-13** present chronic RQs associated with scenario PDCP-81. Chronic RQs for fully aquatic species appear only in **Table Eco-13** since no AUFs were considered for aquatic species. No acute TRVs were available for larval honey bees, so larval honey bees are not included in **Table Eco-10**. Chronic TRVs do not exist for terrestrial insects other than adult and larval honey bees. So, the only terrestrial insects that appear in **Tables Eco-11** through **Eco-13** are the adult and larval honey bee. Those RQs that exceeded the standard LOC of 1.0 appear as bold text, whereas those RQs that exceeded the T&E LOC of 0.5 appear in bold italics.

6.6.1 Risk to Amphibians

No acute or chronic RQs for aquatic- or terrestrial-phase amphibians exceeded LOCs following applications of Altus to individual 0.75-acre blocks of plant in the nursery production areas using ground spray equipment. Therefore, foliar use of Altus in nursery production areas is not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.6.2 Risk to Aquatic Invertebrates

Foliar applications of Altus to individual 0.75-acre blocks in the nursery production areas did not result in acute or chronic RQs that exceeded LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Therefore, applications of Altus to individual blocks of plants in nursery production areas are not likely to be harmful to aquatic invertebrates.

6.6.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, applications of Altus to the individual blocks of plants in nursery production areas are not likely to be harmful to fish.

6.6.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, applications of Altus to individual blocks of plants in nursery production areas are not likely to be harmful to reptiles.

6.6.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, applications of Altus to individual blocks of plants in nursery production areas are not likely to be harmful to birds.

6.6.6 Risk to Mammals

Foliar applications of Altus to individual 0.75-acre blocks in production nursery areas did not result in acute RQs that exceeded the standard or T&E LOCs for any mammal surrogate species. Foliar applications of Altus resulted in chronic RQs that exceeded the T&E LOC for riparian brush rabbit when exposure was estimated according to the AUF. Foliar applications of Altus also resulted in chronic RQs that exceeded LOCs for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel for Midpoint AUF or No AUF exposure estimates. As discussed previously, riparian brush rabbits have herbivorous diets, and big free-tailed bats have insectivorous diets. Southern grasshopper mouse and Nelson's antelope squirrel have mixed diets consisting mostly of terrestrial vegetation and insects. No mammal surrogate species that forage in aquatic habitats have RQs that exceed LOCs.

Decreasing the number of applications to one per year reduced the number of surrogates that exceed LOCs but did not completely eliminate the exceedances. When riparian brush rabbit was assessed assuming exposure using the full AUF, reducing the number of applications to one per year eliminated the exceedance of LOCs. When Midpoint AUF exposure estimates were used, decreasing the number of applications to one per year eliminated LOC exceedances for Nelson's antelope squirrel. Implementing a 25-ft. buffer to foraging habitat for all surrogate species reduced residues in/on vegetation and insects so chronic RQs were less than LOCs when one or two applications occur per year.

6.6.7 Risk to Earthworms

No acute or chronic RQs for earthworms exceeded LOCs. Therefore, applications of Altus to individual blocks of plants in nursery production areas are not likely to be harmful to soil-dwelling invertebrates.

6.6.8 Risk to Terrestrial Insects

When Altus is applied as a foliar application to individual blocks of plants in nursery production areas under PDCP-81, adult honey bees and Blennosperma vernal pool andrenid bees exposed via consumption of pollen or nectar, but not via direct contact, had acute RQs that exceeded LOCs. Chronic RQs exceeded LOCs for adult and larval honey bees when Midpoint AUF and No AUF exposure estimates were used. Although it is unlikely that flowering plants might be accidentally treated in nursery production areas, the worst-case scenario that all flowering plants are treated was used to estimate exposure. Incorporation of CDFA's BMPs to avoid applications to flowering plants and pollinator habitat should result in few if any treated flowering plants

being available as forage for pollinators. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated. In areas flowering plants exist, those flowering plants must not be directly sprayed.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Decreasing the number of applications to one per year would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs for adult honey bees. Implementation of a 25-ft. buffer from the application site to foraging habitat or other site-specific measures as well as adherence to the more recent BeeWhere program discussed earlier would sufficiently reduce exposure and chronic RQs would be less than LOCs for adult and larval honey bees. In areas where a 25-ft. buffer might be impractical, plants currently in bloom must not be directly sprayed.

Table Eco-10. Potential risk associated with Application Scenario PDCP-81 following acute exposure—Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 2 applications per year on a nursery production area (0.75 acres).

Table Eco-10a. PDCP-81 Acute Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.02	0.02	0.01	0.01
Tomales isopod	0.02	0.02	0.01	0.01
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.08	0.00	0.05	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.15	0.00	0.10	0.00

Table Eco-10b. PDCP-81 Acute Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.02	0.02	0.01	0.01
Shasta crayfish	0.02	0.02	0.01	0.01
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
Osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-10c. PDCP-81 Acute Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-10d. PDCP-81 Acute Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-10e. PDCP-81 Acute Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.02	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.03	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.01	0.00	0.01	0.00
white-tailed kite	0.03	0.00	0.02	0.00
Cooper's hawk	0.02	0.00	0.01	0.00
western yellow-billed cuckoo	0.29	0.00	0.20	0.00
purple martin	0.18	0.00	0.12	0.00
mule deer	0.01	0.00	0.01	0.00
riparian brush rabbit	0.06	0.00	0.04	0.00
American badger	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00
big free-tailed bat	0.05	0.00	0.04	0.00
southern grasshopper mouse	0.05	0.00	0.03	0.00
Nelson's antelope squirrel	0.04	0.00	0.03	0.00
earthworm	0.00	0.00	0.00	0.00
honey bee-adult (contact)	0.01	0.00	0.01	0.00
honey bee-adult (oral)	**13.60**	0.11	**9.14**	0.08
Blennosperma vernal pool andrenid bee (contact)	0.01	0.00	0.01	0.00
Blennosperma vernal pool andrenid bee (oral)	**13.60**	0.11	**9.14**	0.08
San Joaquin tiger beetle (contact)	0.01	0.00	0.01	0.00

Table Eco-11. Potential risk associated with Application Scenario PDCP-81 following chronic exposure with full AUF — Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 2 applications per year on a nursery production area (0.75 acres).

Table Eco-11a. PDCP-81 Chronic Full AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.00	0.00	0.00	0.00

Table Eco-11b. PDCP-81 Chronic Full AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
Osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-11c. PDCP-81 Chronic Full AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-11d. PDCP-81 Chronic Full AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.02	0.00	0.01	0.00
terrestrial arroyo toad	0.02	0.00	0.01	0.00
terrestrial western spadefoot	0.01	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.00	0.00
western fence lizard	0.03	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.01	0.00
mourning dove	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.01	0.00	0.00	0.00
purple martin	0.00	0.00	0.00	0.00
mule deer	0.00	0.00	0.00	0.00
riparian brush rabbit	***0.58***	0.00	0.39	0.00
American badger	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.16	0.00	0.10	0.00
big free-tailed bat	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.18	0.00	0.12	0.00
Nelson's antelope squirrel	0.05	0.00	0.04	0.00
Earthworm	0.02	0.00	0.01	0.00
honey bee-adult (oral)	0.00	0.00	0.00	0.00
Honey bee-larvae	0.00	0.00	0.00	0.00

Table Eco-12. Potential risk associated with Application Scenario PDCP-81 following chronic exposure with Midpoint AUF — Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 2 applications per year on a nursery production area (0.75 acres).

Table Eco-12a. PDCP-81 Chronic Midpoint AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.06	0.00	0.04	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.04	0.00	0.03	0.00

Table Eco-12b. PDCP-81 Chronic Midpoint AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
Osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-12c. PDCP-81 Chronic Midpoint AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-12d. PDCP-81 Chronic Midpoint AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.02	0.00	0.01	0.00
terrestrial arroyo toad	0.02	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.01	0.00
western fence lizard	0.03	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.22	0.00	0.14	0.00
purple martin	0.13	0.00	0.09	0.00
mule deer	0.16	0.00	0.11	0.00
riparian brush rabbit	**1.27**	0.01	***0.84***	0.01
American badger	0.02	0.00	0.02	0.00
northwestern San Diego pocket mouse	0.16	0.00	0.10	0.00
big free-tailed bat	***0.89***	0.01	***0.59***	0.00
southern grasshopper mouse	***0.88***	0.01	***0.58***	0.00
Nelson's antelope squirrel	***0.72***	0.01	0.48	0.00
Earthworm	0.02	0.00	0.01	0.00
honey bee-adult (oral)	***0.63***	0.01	0.42	0.00
Honey bee-larvae	**2.82**	0.02	**1.88**	0.02

Table Eco-13. Potential risk associated with Application Scenario PDCP-81 following chronic exposure with no AUF — Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: 2 applications per year on a nursery production area (0.75 acres).
Table Eco-13a. PDCP-81 Chronic No AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.02	0.02	0.01	0.01
Tomales isopod	0.02	0.02	0.01	0.01
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.11	0.00	0.07	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.08	0.00	0.05	0.00

Table Eco-13b. PDCP-81 Chronic No AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.02	0.02	0.01	0.01
Shasta crayfish	0.02	0.02	0.01	0.01
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-13c. PDCP-81 Chronic No AUF Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-13d. PDCP-81 Chronic No AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-13e. PDCP-81 Chronic No AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Hold, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.02	0.00	0.01	0.00
terrestrial arroyo toad	0.02	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.03	0.00	0.02	0.00
blunt-nosed leopard lizard	0.03	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.43	0.00	0.29	0.00
purple martin	0.26	0.00	0.18	0.00
mule deer	0.33	0.00	0.22	0.00
riparian brush rabbit	**1.95**	0.02	**1.30**	0.01
American badger	0.05	0.00	0.03	0.00
northwestern San Diego pocket mouse	0.16	0.00	0.10	0.00
big free-tailed bat	**1.78**	0.01	**1.19**	0.01
southern grasshopper mouse	**1.58**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.39**	0.01	***0.93***	0.01
earthworm	0.02	0.00	0.01	0.00
honey bee-adult (oral)	**1.25**	0.01	***0.83***	0.01
Honey bee-larvae	**5.63**	0.05	**3.75**	0.03

6.7 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications for Entire Nursery using Altus as a Ground Application (PDCP-82) or Aerial Application (PDCP-83)

The risk analysis focused on whether the RQs resulting from foliar applications of Altus to the entire nursery using ground spray equipment (PDCP-82) or aerial equipment (PDCP-83) exceed the standard or T&E LOC. Foliar applications of Altus for the control of GWSS would be made to containerized nursery stock throughout the entire nursery while maintained in production areas. Deposition to the nursery production area soil beneath the containerized nursery stock is possible. Applications would be made twice per year at 6-month intervals to the entire nursery production area. Additionally, as described in Section 2.10.2: Technical Assistance from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing buffers or other suitable measures.

In the PDCP, Altus using ground equipment (PDCP-82) or aerial equipment (PDCP-83) applied as a foliar treatment to the entire nursery production areas twice per year was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-14** presents the acute RQs and **Tables Eco-15** through **Eco-17** present chronic RQs associated with scenario PDCP-82. **Table Eco-18** presents the acute RQs and **Tables Eco-19** through **Eco-21** present chronic RQs associated with scenario PDCP-83 when applications are made aerially. Chronic RQs for fully aquatic species appear only in **Tables Eco17** and **Eco-21** since no AUFs were considered for aquatic species. No acute TRVs were available for larval honey bees, so larval honey bees are not included in **Tables Eco-14** or **Eco-18**. Chronic TRVs do not exist for terrestrial insects other than adult and larval honey bees. So, the only terrestrial insects that appear in **Tables Eco-15** through **Eco-17** and **Tables Eco-19** through **Eco-21** are the adult and larval honey bee. Those RQs that exceeded the standard LOC of 1.0 appear as bold text, whereas those RQs that exceeded the T&E LOC of 0.5 appear in bold italics.

6.7.1 Risk to Amphibians

No acute or chronic RQs for aquatic- or terrestrial-phase amphibians exceeded LOCs when the entire nursery is treated using ground or aerial spray equipment. Therefore, foliar use of Altus when the entire nursery is treated is not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.7.2 Risk to Aquatic Invertebrates

No acute or chronic RQs for marine/estuarine or freshwater aquatic invertebrates exceeded LOCs. Therefore, foliar applications of Altus when the entire nursery is treated using ground or aerial spray equipment are not likely to be harmful to aquatic invertebrates.

6.7.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, foliar applications of Altus when the entire nursery is treated using ground or aerial spray equipment are not likely to be harmful to fish.

6.7.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, use of Altus as a foliar treatment when the entire nursery is treated using ground or aerial spray equipment is not likely to be harmful to reptiles.

6.7.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, use of Altus as a foliar treatment when the entire nursery is treated using ground or aerial spray equipment is not likely to be harmful to birds.

6.7.6 Risk to Mammals

Foliar applications of Altus to the entire nursery using ground or aerial spray equipment did not result in acute RQs that exceeded the standard or T&E LOCs for any mammal surrogate species. Foliar applications of Altus resulted in chronic RQs that exceeded the T&E and standard LOCs for riparian brush rabbit, southern grasshopper mouse, and Nelson's antelope squirrel when exposure was estimated according to the AUF. Foliar applications of Altus also resulted in chronic RQs that exceeded LOCs for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel for Midpoint AUF or No AUF exposure estimates. The treatment area of 130 acres is greater than the foraging range for the affected species except the big free-tailed bat, so no differences existed in risk estimates based on full AUF, Midpoint AUF or No AUF exposures for the riparian brush rabbit, southern grasshopper mouse, and Nelson's antelope squirrel. As discussed previously, riparian brush rabbits have herbivorous diets, and big free-tailed bats have insectivorous diets. Southern grasshopper mouse and Nelson's antelope squirrel have mixed diets consisting mostly of terrestrial vegetation and insects. No mammal surrogate species that forage in aquatic habitats had RQs that exceeded LOCs.

Decreasing the number of applications to one per year did little to reduce chronic exposures and did not eliminate the exceedances. For both ground and aerial applications, implementing a 25-ft. buffer to foraging habitat for all affected surrogate species reduced residues in/on vegetation and insects so chronic RQs were less than LOCs when one or two applications occur per year.

6.7.7 Risk to Earthworms

No acute or chronic RQs for earthworms exceeded LOCs. Therefore, use of Altus as a foliar treatment when the entire nursery is treated using ground or aerial spray equipment is not likely to be harmful to soil-dwelling invertebrates.

6.7.8 Risk to Terrestrial Insects

When Altus is applied as a foliar application to the entire nursery using ground or aerial spray equipment under PDCP-82 or aerial spray equipment under PDCP-83, adult honey bees and Blennosperma vernal pool andrenid bees exposed via consumption of pollen or nectar, but not via direct contact, had acute RQs that exceeded LOCs. Chronic RQs exceeded LOCs for adult and larval honey bees when Midpoint AUF and No AUF exposure estimates were used. Although it is unlikely that flowering plants might be treated in nursery production areas, the worst-case scenario that all flowering plants are treated was used to estimate exposure. Incorporation of CDFA's BMPs to avoid applications to flowering plants and pollinator habitat should result in few if any treated flowering plants being available as forage for pollinators. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated. In areas flowering plants exist, those flowering plants must not be directly sprayed.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Decreasing the number of applications to one per year would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs for adult honey bees assuming Midpoint AUF exposure estimated, but not with No AUF exposure estimates. Implementation of a 25-ft. buffer from the application site to foraging habitat or other site-specific measures as well as adherence to the more recent BeeWhere program discussed earlier would sufficiently reduce exposure and chronic RQs would be less than LOCs for adult and larval honey bees when one or two applications occur per year. In areas where a 25-ft. buffer might be impractical, plants currently in bloom must not be directly sprayed.

Table Eco-14. Potential risk associated with Application Scenario PDCP-82 following acute exposure —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Ground Application to Entire Nursery (130 acres).

Table Eco-14a. PDCP-82 Acute Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.14	0.14	0.14	0.14
Tomales isopod	0.14	0.14	0.14	0.14
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.07	0.01	0.06	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.14	0.01	0.11	0.01

Table Eco-14b. PDCP-82 Acute Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.14	0.14	0.14	0.14
Shasta crayfish	0.14	0.14	0.14	0.14
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
Osprey	0.01	0.01	0.01	0.01
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-14c. PDCP-82 Acute Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.01	0.01	0.01	0.01
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-14d. PDCP-82 Acute Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.01	0.01	0.01	0.01
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.01	0.01	0.01
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-14e. PDCP-82 Acute Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.01	0.00	0.01	0.00
white-tailed kite	0.02	0.00	0.02	0.00
Cooper's hawk	0.01	0.00	0.01	0.00
western yellow-billed cuckoo	0.24	0.00	0.20	0.00
purple martin	0.16	0.01	0.13	0.01
mule deer	0.01	0.00	0.01	0.00
riparian brush rabbit	0.05	0.00	0.04	0.00
American badger	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00
big free-tailed bat	0.04	0.00	0.04	0.00
southern grasshopper mouse	0.04	0.00	0.03	0.00
Nelson's antelope squirrel	0.03	0.00	0.03	0.00
Earthworm	0.00	0.00	0.00	0.00
honey bee-adult (contact)	0.01	0.00	0.01	0.00
honey bee-adult (oral)	**11.32**	0.09	**9.14**	0.08
Blennosperma vernal pool andrenid bee (contact)	0.01	0.00	0.01	0.00
Blennosperma vernal pool andrenid bee (oral)	**11.32**	0.09	**9.14**	0.08
San Joaquin tiger beetle (contact)	0.01	0.00	0.01	0.00

Table Eco-15. Potential risk associated with Application Scenario PDCP-82 following chronic exposure with full AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Ground Application to Entire Nursery (130 acres).

Table Eco-15a. PDCP-82 Chronic Full AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.07	0.01	0.06	0.01

Table Eco-15b. PDCP-82 Chronic Full AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
Osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-15c. PDCP-82 Chronic Full AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.01	0.01	0.01	0.01

Table Eco-15d. PDCP-82 Chronic Full AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.24	0.02	0.19	0.02
mule deer	0.06	0.00	0.04	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.01	0.00	0.01	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	0.00	0.00	0.00	0.00
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
Earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	0.02	0.00	0.01	0.00
Honey bee-larvae	0.08	0.00	0.06	0.00

Table Eco-16. Potential risk associated with Application Scenario PDCP-82 following chronic exposure with Midpoint AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Ground Application to Entire Nursery (130 acres).

Table Eco-16a. PDCP-82 Chronic Midpoint AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.05	0.01	0.04	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.07	0.01	0.06	0.01

Table Eco-16b. PDCP-82 Chronic Midpoint AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
Osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.02	0.02	0.01	0.01

Table Eco-16c. PDCP-82 Chronic Midpoint AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.02	0.02	0.02	0.02

Table Eco-16d. PDCP-82 Chronic Midpoint AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.24	0.02	0.19	0.02
mule deer	0.16	0.00	0.13	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.03	0.00	0.02	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	***0.74***	0.01	***0.60***	0.00
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
Earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	***0.53***	0.00	0.42	0.00
Honey bee-larvae	**2.38**	0.02	**1.91**	0.02

Table Eco-17. Potential risk associated with Application Scenario PDCP-82 following chronic exposure with no AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Ground Application to Entire Nursery (130 acres).
Table Eco-17a. PDCP-82 Chronic No AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.12	0.12	0.12	0.12
Tomales isopod	0.12	0.12	0.12	0.12
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.10	0.01	0.08	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.07	0.01	0.06	0.01

Table Eco-17b. PDCP-82 Chronic No AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.12	0.12	0.12	0.12
Shasta crayfish	0.12	0.12	0.12	0.12
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
osprey	0.01	0.01	0.01	0.01
southwestern river otter	0.03	0.03	0.03	0.03

Table Eco-17c. PDCP-82 Chronic No AUF Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-17d. PDCP-82 Chronic No AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.01	0.00	0.00
southern sea otter	0.02	0.02	0.02	0.02

Table Eco-17e. PDCP-82 Chronic No AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.24	0.02	0.19	0.02
mule deer	0.27	0.00	0.22	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.04	0.00	0.03	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	**1.48**	0.01	**1.19**	0.01
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	**1.04**	0.01	***0.83***	0.01
Honey bee-larvae	**4.69**	0.04	**3.75**	0.03

Table Eco-18. Potential risk associated with Application Scenario PDCP-83 following acute exposure —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Aerial Application to Entire Nursery (130 acres).

Table Eco-18a. PDCP-83 Acute Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.30	0.30	0.28	0.28
Tomales isopod	0.30	0.30	0.28	0.28
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.08	0.02	0.07	0.02
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.15	0.03	0.13	0.03

Table Eco-18b. PDCP-83 Acute Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.30	0.30	0.28	0.28
Shasta crayfish	0.30	0.30	0.28	0.28
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
osprey	0.02	0.02	0.02	0.02
southwestern river otter	0.00	0.00	0.00	0.00

Table Eco-18c. PDCP-83 Acute Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.03	0.03	0.02	0.02
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-18d. PDCP-83 Acute Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.03	0.03	0.02	0.02
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.02	0.02	0.02	0.02
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-18e. PDCP-83 Acute Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.01	0.00	0.01	0.00
white-tailed kite	0.02	0.00	0.02	0.00
Cooper's hawk	0.01	0.00	0.01	0.00
western yellow-billed cuckoo	0.24	0.00	0.20	0.00
purple martin	0.17	0.03	0.14	0.03
mule deer	0.01	0.00	0.01	0.00
riparian brush rabbit	0.05	0.00	0.04	0.00
American badger	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00
big free-tailed bat	0.04	0.00	0.04	0.00
southern grasshopper mouse	0.04	0.00	0.03	0.00
Nelson's antelope squirrel	0.03	0.00	0.03	0.00
earthworm	0.00	0.00	0.00	0.00
honey bee-adult (contact)	0.01	0.00	0.01	0.00
honey bee-adult (oral)	**11.32**	0.09	**9.14**	0.08
Blennosperma vernal pool andrenid bee (contact)	0.01	0.00	0.01	0.00
Blennosperma vernal pool andrenid bee (oral)	**11.32**	0.09	**9.14**	0.08
San Joaquin tiger beetle (contact)	0.01	0.00	0.01	0.00

Table Eco-19. Potential risk associated with Application Scenario PDCP-83 following chronic exposure with full AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Aerial Application to Entire Nursery (130 acres).

Table Eco-19a. PDCP-83 Chronic Full AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.08	0.02	0.06	0.01

Table Eco-19b. PDCP-83 Chronic Full AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.01	0.01	0.01	0.01

Table Eco-19c. PDCP-83 Chronic Full AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.03	0.03	0.03	0.03

Table Eco-19d. PDCP-83 Chronic Full AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.26	0.04	0.21	0.04
mule deer	0.06	0.00	0.04	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.01	0.00	0.01	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	0.00	0.00	0.00	0.00
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	0.02	0.00	0.01	0.00
Honey bee-larvae	0.08	0.00	0.06	0.00

Table Eco-20. Potential risk associated with Application Scenario PDCP-82 following chronic exposure with Midpoint AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Aerial Application to Entire Nursery (130 acres).

Table Eco-20a. PDCP-82 Chronic Midpoint AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.06	0.01	0.05	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.08	0.02	0.06	0.01

Table Eco-20b. PDCP-82 Chronic Midpoint AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
Osprey	0.01	0.01	0.01	0.01
southwestern river otter	0.03	0.03	0.03	0.03

Table Eco-20c. PDCP-82 Chronic Midpoint AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.01	0.01	0.01
southern sea otter	0.03	0.03	0.03	0.03

Table Eco-20d. PDCP-82 Chronic Midpoint AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.26	0.04	0.21	0.04
mule deer	0.16	0.00	0.13	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.03	0.00	0.02	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	***0.74***	0.01	***0.60***	0.00
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
Earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	***0.53***	0.00	0.42	0.00
Honey bee-larvae	**2.38**	0.02	**1.91**	0.02

Table Eco-21. Potential risk associated with Application Scenario PDCP-83 following chronic exposure with no AUF —Foliar application of Altus (Flupyradifurone) at 0.137 lb. a.i./acre: Aerial Application to Entire Nursery (130 acres).
Table Eco-21a. PDCP-83 Chronic No AUF Freshwater Pool or Wetland Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic California tiger salamander	0.01	0.01	0.01	0.01
aquatic California red-legged frog	0.01	0.01	0.01	0.01
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.01	0.01	0.01	0.01
vernal pool fairy shrimp	0.27	0.27	0.25	0.25
Tomales isopod	0.27	0.27	0.25	0.25
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.12	0.03	0.10	0.02
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.08	0.02	0.06	0.01

Table Eco-21b. PDCP-83 Chronic No AUF Freshwater River Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
aquatic arroyo toad	0.01	0.01	0.01	0.01
aquatic southern torrent salamander	0.01	0.01	0.01	0.01
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.01	0.01	0.01	0.01
terrestrial foothill yellow-legged frog	0.01	0.00	0.01	0.00
California freshwater shrimp	0.27	0.27	0.25	0.25
Shasta crayfish	0.27	0.27	0.25	0.25
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.01	0.01	0.01	0.01
Chinook salmon	0.01	0.01	0.01	0.01
Osprey	0.02	0.02	0.02	0.02
southwestern river otter	0.06	0.06	0.05	0.05

Table Eco-21c. PDCP-83 Chronic No AUF Estuarine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
mimic tryonia	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00

Table Eco-21d. PDCP-83 Chronic No AUF Marine Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.01	0.01	0.01
southern sea otter	0.04	0.04	0.04	0.04

Table Eco-21e. PDCP-83 Chronic No AUF Terrestrial Species

Surrogate Species	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Drift Buffer to Water, 25 ft Drift Buffer to Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water or Habitat	Reduced Exp.- Board, 1 app/yr; No Drift Buffer to Water, 25 ft Drift Buffer to Habitat
terrestrial California tiger salamander	0.01	0.00	0.01	0.00
terrestrial arroyo toad	0.01	0.00	0.01	0.00
terrestrial western spadefoot	0.02	0.00	0.01	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.02	0.00	0.01	0.00
western fence lizard	0.02	0.00	0.02	0.00
blunt-nosed leopard lizard	0.02	0.00	0.02	0.00
mourning dove	0.01	0.00	0.01	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.36	0.00	0.29	0.00
purple martin	0.26	0.04	0.21	0.04
mule deer	0.27	0.00	0.22	0.00
riparian brush rabbit	**1.62**	0.01	**1.30**	0.01
American badger	0.04	0.00	0.03	0.00
northwestern San Diego pocket mouse	0.13	0.00	0.10	0.00
big free-tailed bat	**1.48**	0.01	**1.19**	0.01
southern grasshopper mouse	**1.31**	0.01	**1.05**	0.01
Nelson's antelope squirrel	**1.16**	0.01	***0.93***	0.01
earthworm	0.01	0.00	0.01	0.00
honey bee-adult (oral)	**1.04**	0.01	***0.83***	0.01
Honey bee-larvae	**4.69**	0.04	**3.75**	0.03

7 Uncertainties

Uncertainty in ecological risk assessment derives partly from biological variability. The response of ecological receptors following exposure to contaminants will vary among individuals within a species as well as across species. Also, literature values from various species are used to predict the response of the surrogate species of interest in this ERA. The differences among species always introduces unavoidable uncertainty to an ERA. Uncertainty regarding predictions in a risk assessment may be due to inherent randomness, limited knowledge, or lack of knowledge (Suter, 2007: p. 69).

A common practice in ERAs is to apply uncertainty factors to various values used in calculations to estimate potential risk. In this ERA, we applied uncertainty factors to toxicity endpoints in the development of TRVs when the ideal value (*e.g.*, acute or chronic NOAELs) is not available. In the development of TRVs (Section 4: Effects Assessment of the of the Ecological Risk Assessment of the Statewide PEIR [CDFA, 2014a]), the uncertainty factors suggested by the U.S. Army (2000) and USEPA (2004j) were used. Uncertainty factors were also applied when using the biomagnification factor (BMF) to estimate tissue concentration in predatory terrestrial vertebrates. In this instance, using the BMF from shrews developed by Armitage and Gobas (2007) and applying that BMF to terrestrial vertebrates is novel and no published references were available for determining appropriate uncertainty factors. Professional judgment is used in assigning uncertainty factors to the shrew BMF.

7.1 Exposure Assessment Uncertainties

In this ERA, exposure of ecological receptors could not be directly measured. Models were used to estimate exposure following applications of Altus. The use of models to estimate exposure necessarily introduces uncertainty regarding how well those models will predict the exposure that actually occurs following applications. Reliance on exposure models developed by the USEPA was intended to standardize the approach here and to reduce the potential of underestimating exposure.

7.1.1 Application Scenarios

Altus application scenarios were based on descriptions provided by CDFA staff. Where a range of conditions were possible, such as the area of an application site, CDFA staff were requested to provide conditions that were ‘reasonably foreseeable’ and tending toward worse case. The most common conditions under which applications were likely to be made were analyzed, but some uncommon conditions that could lead to greater or lesser exposure than the scenarios represented in the risk assessment were not analyzed. For example, to produce a quantitative estimate of risk, the area of application needed to be defined. It is certainly possible that smaller or larger application areas than used in this ERA could occur in the future.

For nursery scenarios involving applications to containerized plants, it was assumed that treated containers were arranged such that approximately 80% and 60% of the pesticide from ground and aerial applications, respectively, was contained within the pot or deposited on foliage

directly above the pot for ground applications, while approximately 20% and 40% of the pesticide from ground and aerial applications, respectively, was assumed to be subject to transport to water. Because the arrangement and density of treated containers may vary, making this assumption adds uncertainty as exposure estimates may be over- or under-estimated based on site-specific conditions.

For urban/residential application scenarios, the application area was defined as a 17.5-acre area representing the entire area within the prescribed 150-m distance from a GWSS find. Treatments will be applied to host plants only. Within an application area, many features would not be treated such as pavement, buildings, non-host plant material, and lawns. Following the approach used in previous PEIR Addenda, it was assumed approximately one-third of the entire area was treated. Since it is not possible to know how many host plants would exist within the 17.5-acre application area, assuming one-third of the area is treated adds uncertainty.

7.1.2 Aquatic Exposure Assessment

Water concentrations used to estimate exposure for drinking water of terrestrial species or for uptake into aquatic prey were based on outputs from USEPA's (2016f) PWC model. PWC did not provide a means to appropriately estimate water concentrations in surface water that was not immediately adjacent to the application site. The inability to accurately model concentrations in water bodies not immediately adjacent to application sites tended to produce an overestimate for water concentrations. The resulting risk estimates would therefore be exaggerated.

Water concentrations in PWC are based on what would occur in a 1-ha (2.471-acre) waterbody. In reality, a wide variety of water bodies could be adjacent to application sites. Estimated concentrations from PWC would underestimate concentrations for vernal pools or other water bodies that are smaller and shallower than the modeled waterbody. However, where water bodies were larger, the estimates were likely greatly exaggerated. PWC did not allow for estimated water concentrations in a flowing water body. Any flow that would dilute the concentration would lead to an overestimation of water concentrations by PWC.

Uptake from water into aquatic prey was estimated using KABAM (USEPA, 2009s). KABAM had a limitation in the range of chemicals for which it provided appropriate tissue concentrations. Chemicals with Log K_{ow} outside the ideal range of 4 to 8 such as flupyradifurone are not appropriate for use with KABAM. However, KABAM is a model developed by USEPA for estimating tissue concentrations and no other USEPA model exists for chemicals outside the range of Log K_{ow} of 4 to 8. It is not known whether use of KABAM on chemicals with Log K_{ow} outside the ideal range would produce under or overestimates of tissue concentrations because the model was not validated with chemicals outside of this range.

No attempt was made to eliminate food items, such as aquatic invertebrates or fish that might have died from exposure to the pesticide prior to being available for consumption. Since it is unlikely that dead prey would be consumed, failure to eliminate dead prey would have produced an overestimation of exposure.

7.1.3 Marine/Estuarine Exposure Assessment

No models were available for estimating water concentrations in marine/estuarine environments. Many of the same uncertainties existed for marine/estuarine environments as for freshwater environments. It is not known how a more saline environment might affect the outputs from the models. PWC was expected to greatly exaggerate the water concentrations in marine/estuarine habitats because of the much larger volume of water present in the marine/estuarine environments and the routine flushing of the areas from tides and wave action.

7.1.4 Terrestrial Exposure Assessment

Whenever EECs are based on modeled residues, uncertainty exists regarding the representativeness of the model outputs. T-REX, the model used for many of the EECs in terrestrial food items was developed from empirical data for vegetation (Hoerger and Kenaga, 1972, Fletcher *et al.*, 1994), but also estimates residues on food items such as fruits, seeds and insects. The model has been updated to better estimate residues on insects (USEPA, 2012i), but residues on seeds were not based on empirical data. Without empirical data to evaluate seed residues, the accuracy of the estimated concentrations is not known. However, by using models developed by the USEPA, significant effort was made to reduce the chances that exposure was underestimated. Also, the husks of many seeds or fruits might be discarded when wildlife eat them, which would cause the EEC used in the ERA to be greater than actual exposure and risks overestimated.

Systemic residues taken up by plants tissues or terrestrial invertebrates were estimated using the modified Briggs equation, and primarily influenced on the K_{ow} of the pesticides and assumed to be instantaneous. In reality, uptake from an environmental media such as soil or water would occur over an extended time period making any acute EECs selected shortly after an application an overestimation of what was actually present within the plant or animal tissue. Many factors can influence the rate of uptake in plants. Water soluble chemicals are taken up more quickly when plants are actively transpiring and water is available for uptake (*i.e.*, they are not under drought conditions). Other pesticides will be taken up more quickly when plants are actively metabolizing and absorbing nutrients. The actual rate will depend on chemical characteristics and the conditions at the time of and following an application, but the uptake definitely will not be instantaneous.

Concentrations of pesticides in soil were based on the amount concentrated in the upper 15 cm. Residues were assumed to instantaneously be distributed throughout the soil column. For an acute exposure to soil in the diet, such an assumption of instantaneous distribution would lead to an underestimation of exposure to concentrations in surface soils immediately following an application as the pesticides may not have had time to migrate through the full 15 cm. Since many pesticides are known to penetrate deeper than 15 cm (*e.g.,* Ramanand *et al*., 1988; Zhang *et al*., 2000), limiting the penetration zone to only 15 cm leads to an overestimation of chronic exposures.

Tissue concentrations in terrestrial vertebrate prey were assumed to be equivalent to the daily intake of a pesticide. Initially, these residues would necessarily be concentrated in the gastrointestinal tract and not uniformly distributed throughout the body. Over the longer term,

the concentration in other body tissues will depend on the degree to which pesticides are absorbed from the gastrointestinal tract, the rate at which they are metabolized, and the rate at which they are excreted. The amounts of pesticide present in the gastrointestinal tract is generally higher than in other tissues because it will contain residues from the diet that might pass through unabsorbed. If the gastrointestinal tract is preferentially selected or avoided in larger prey, exposure estimates could be systematically over or underestimated.

The only terrestrial vertebrate model for calculating a BMF for chronic exposures of predators is for the simple food chain of soil → earthworm → shrew (Armitage and Gobas, 2007). The applicability of using the shrew BMF to other mammals and other terrestrial vertebrate groups is not known. Whether use of this model produces a systematic over or underestimation of exposure is not known.

No attempt was made to eliminate food items, particularly insect prey that might have died from exposure to the pesticide prior to being available for consumption. Since it was unlikely that dead prey would be consumed by predators or insectivores, failure to eliminate dead or moribund prey would have produced an overestimation of exposure.

Since this ERA is attempting to address potential future applications of pesticides, the proximity of application sites to each other is not known. For species with large foraging areas, an AUF was used to account for the difference between the area where pesticide applications occur and the full area where a terrestrial species could forage. Should more than one application site occur within a species' foraging range, use of an AUF would underestimate potential exposure. In addition to presenting RQs based on an AUF, RQs estimated from exposure based on no AUF and a Midpoint AUF were also presented. Without knowing the distribution of application sites across a species foraging range, the appropriateness of any of these estimates of exposure cannot be known. By including the full range of possibilities from using an AUF to assuming the full foraging range could be treated, the complete range of exposures and the resulting RQs were presented.

7.1.5 Exposure of Birds and Mammals to Aquatic Prey

Osprey or southwestern river otter that typically forage in freshwater habitats larger than the farm pond modeled in PWC or the California brown pelican and southern sea otter that forage in marine/estuarine environments are among species likely to be exposed to prey from waters with lower concentrations than estimated by PWC.

7.2 Effects Assessment Uncertainties

7.2.1 Use of Surrogate Species Effects Data

Toxicity data were rarely available for the surrogate species considered in the risk assessment. Use of effects data from species other than the species of concern inherently added uncertainty to the assessment. When toxicity data for more than one species was available, the more sensitive species was selected. Data from species as closely related as possible were used. For example, when toxicity data from a passerine species was available, it was used for the passerine birds in the assessment.

Toxicity data were not always available for all taxonomic groups. This lack of data was most common for amphibians and reptiles. Bird or fish toxicity data were used when no data were available for terrestrial-phase amphibians and reptiles or aquatic-phase amphibians, respectively. It was not known when this approach might lead to an over or underestimation of risk.

7.2.2 Sublethal Effects

Sublethal effects were not specifically addressed, but when ecologically relevant sublethal toxicity endpoints were available on which to base TRVs, those results were preferentially selected. Sublethal effects for flupyradifurone have been identified in the aquatic stage of mayflies (*Hexagenia* spp.) and amphipods (*Hyalella azteca*) (Bartlett *et al.*, 2018; 2019). Various sublethal effects have been identified for honey bees such as immune response (Nagger and Baer, 2019), foraging (Hesselbach and Scheiner, 2018; Hesselbach *et al.*, 2020; Tong *et al.*, 2019; Wu *et al.* 2021), motor abilities (Hesselbach and Scheiner, 2019), physiological response (Chakrabarti *et al*., 2020). If it often unclear how representative the exposure scenarios and doses in these studies are for the exposure possible following applications within the PDCP program.

7.2.3 Dermal or Inhalation Effects

In ERAs, it is standard practice to only address effects from oral exposure for terrestrial vertebrates. In general, focusing on effects from oral exposures is adequate (Suter, 2007: pp. 258-259). However, for terrestrial-phase amphibians, it is possible that dermal exposure to pesticide on surface soils might be readily absorbed and contribute to adverse effects in these species. Effects data for this pathway do not exist, so any effects from contact of terrestrial-phase amphibians to pesticides in soils are unknown. Also, inhalation exposure to airborne concentrations of pesticides can occur. Effects data from inhalation exposure are also lacking for wildlife species. The inability to include any potential risk derived from dermal or inhalation exposure will necessarily underestimate total risk, but since these routes are thought to generally be negligible, exclusion of exposure from these routes did not seriously affect the assessment of risk.

7.2.4 Synergism

Synergism is the effect caused when exposure to two or more chemicals concurrently or consecutively results in health effects that are greater than the sum of the effects of the individual chemicals (Health Canada, 2016c). Uncertainty exists as to whether any of the chemicals analyzed in this ERA produce synergistic effects. No endpoints were available in the literature to evaluate synergistic relationships for active and inert ingredients analyzed in this ERA. Therefore, synergistic effects could not be evaluated in this risk assessment.

8 Conclusions

This ERA was conducted to determine the potential harm to ecological receptors from foliar applications of Altus for control of GWSS. The ERA was conducted using procedures and methodologies commonly used by government agencies such as USEPA as well as the risk assessment profession. The ERA relied upon the three-stage process for risk assessments:

problem formulation, analysis, and risk characterization. CDFA and its risk assessment team consulted with DPR and OEHHA to determine the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxicity effects based on scientific literature. DPR and OEHHA assisted to facilitate the exchange of information such that this ERA meets both the public outreach and scientific goals desired by CDFA for the Proposed Program. The problem formulation stage concluded with a CSM that identified the complete exposure pathways carried forward in the analysis based on information that was available to evaluate the potential exposure pathways. During the analysis phase of the ERA, detailed exposure was estimated with models incorporating appropriate data and conservative assumptions. Also in the analysis phase, effect values were developed which incorporated the toxicologic properties of the pesticides along with safety factors to address uncertainty. The risk characterization phase provided conclusions on the potential for adverse effects to occur to ecological receptors. The risk characterization phase utilized both a quantitative and qualitative assessment. If the estimated RQ was below the LOC, then it was concluded that the potential for adverse effects is low. If the estimated RQ was above the LOC, then a qualitative assessment was conducted to incorporate information that the quantitative models are not capable of considering appropriately.

Section 6: Risk Characterization lists the detailed results of the risk characterization phase for every species class. In some situations where the quantitative assessment indicated the RQ was below the LOC, it was easily concluded that the potential for adverse effects was low. When the RQ was above the LOC, several qualitative considerations typically result in a conclusion that the potential for adverse effects would be low. As described in Section 6: Risk Characterization, the qualitative assessment considers the potential for species presence at an application site, incorporation of foraging range and diet, and fate and transport processes such as dilution and degradation.

In this ERA, few groups of ecological receptors were found to have RQs that exceed LOCs. These include insectivorous or herbivorous mammals, terrestrial insects, including pollinators, and aquatic invertebrates. CDFA's BMPs are designed to greatly reduce, if not eliminate, movement to surface water. For nursery loading dock locations near water, applications will be limited to once per week to avoid accumulation of run-off to surface water. Therefore, actual impacts to aquatic invertebrates are anticipated to be minimal. Because of the targeted nature of the application on loading docks and nursery production areas only those insects dwelling on ornamental host plants would be directly exposed. In urban/residential settings, only host plants are treated, greatly limiting the potential for exposure to nontarget insects. Most insects, such as flying insects, would receive very limited exposure. Since most flying insects would be minimally exposed, those insectivorous species that focus on flying insects are anticipated to be exposed to a limited extent and impacts would be minimal. For mammals, only herbivorous mammals that forage in urban/residential settings on or near ornamental plants are possible to be exposed.

This ERA, along with the Statewide PEIR, will be used to assist CDFA in assessing the potential effects on particular species and developing site-specific measures to protect these species. This ERA did not identify new significant environmental effects or substantial increases in the severity of the significant effects identified in the PEIR accruing to the use of these scenarios in addition to previously analyzed treatment scenarios. No alterations to any of the scenarios

assessed in this ERA that were not already indicated for other scenarios in the PEIR are recommended for the protection of biological resources.

9 Literature

References for this report may be found in the Dashboard Database 4.0.

NOTE: References match those previously listed in the Statewide PEIR (CDFA, 2014a). Therefore, lettering order following publication years may not always be in sequence in this report. Links to webpages were active as of the listed access date. Access to those web resources and information presented therein are subject to change.

Appendix Eco-A. Program Material Data Sheet (PMDS).

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by (CDFA): **Craig Hanes** Date: 4/15/20

☒Reviewed, ☐ Revised, ☐ Approved by: (Blankinship):J. Sullivan Date: 4/21/20

☐Reviewed, X Revised, ☐ Approved by: (CDFA)**:Craig Hanes** Date: **5/11/20**

☒ Reviewed, ☒ Revised, ☐ Approved by: (Blankinship): **J. Sullivan** Date: **5/14/20**

☐Reviewed, x Revised, ☐ Approved by:

(CDFA): **Craig Hanes** Date: **5/19/2020**

☐Reviewed, X Revised, X Approved by: (Blankinship): J. Sullivan Date: 6/3/20

Scenario Name: PDCP-79

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Residential	Landscape host material	Statewide

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
n/a	Minimum of 4 years	Various	Ornamentals/Fruit Trees

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Potential overspray to turf, bare soil, or non-target plants	Foliar spray	Mechanically pressurized sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
Once per year per location	Once per year per location	17.5 acres	17.5 acres

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz Per acre	100 gallons per acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate

[2] Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Applications made in a 150 m radius around a find.
- Applications made to ornamentals.
- Applications could be made to ground covers and fruit trees.
- No applications made to vegetables, but other fruit trees could be treated.
- No direct applications made to turf.
- Lawn furniture, lawn toys, are removed or covered.
- Water containers and features are tarped or covered.
- Application rate of 10.5 fl. oz. Altus/100 gal tank mix.
- Overspray to impervious surfaces avoided.
- Pre-treatment notification of at least 48 hours in advance provided to all properties.
- Residents are provided notices regarding re-entry period of “once the spray has dried.”
- Notices will indicate any pre-harvest interval for fruit consumption as specified in the label.
- Minimize exposure to pollinators by applying outside of daily peak foraging periods.

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

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PMDS Status Summary

Prepared by
(CDFA): **S. Oswalt** Date: 4/14/20

☒Reviewed, ☐ Revised, ☐ Approved by:
(Blankinship):J. Sullivan Date: 4/21/20

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): S. Oswalt Date: 5/6/20

☒ Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): J. Sullivan Date: 5/14/20

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): S. Oswalt Date: 5.15.20

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 5/28/20

Scenario Name: PDCP-80

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium and Most Large Production Nursery	Containerized nursery stock on loading dock	Statewide

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery Stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Loading dock surface (concrete, soil)	Foliar spray	Mechanically pressurized handgun sprayer, boom sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
150	2 days	3750 sq. ft.	3750 sq. ft.

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz / acre	100 gallons /acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate

[2] Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Each plant receives a single application on loading dock prior to shipment.
- Plants are not loaded onto shipping trucks until the REI period has elapsed.
- Loading consist of either palleted plants or individuals pots manually lifted.
- Treated host plants on loading docks are isolated from other nursery stock or other nontarget plants.
- Re-entry signs are posted around treated plants.
- The Restricted Entry Interval (REI) is 12 hours.
- Applying 10.5 fl oz of Altus / 100 gallons /acre
- Minimize exposure to pollinators by applying outside of daily peak foraging periods.

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

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5.) Include units as needed.
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Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Oswalt** Date: 4/14/20

☒Reviewed, ☐ Revised, ☐ Approved by:
(Blankinship):J. Sullivan Date: 4/21/20

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(CDFA): S.Oswalt Date: 5.6.20

☒ Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): J. Sullivan Date: 5.14.20

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): S.Oswalt Date: 5.15.20

☐Reviewed, ☐ Revised, x Approved by:
(Blankinship): J. Sullivan Date: 5/28/20

Scenario Name: PDCP-81

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium and Most Large Production Nursery	Containerized nursery stock	Statewide

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery Stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Soil, drift to nontarget nursery plants	Foliar spray	Mechanically pressurized handgun sprayer, boom sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
2	90 days	0.75 acres	0.75 acres

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz / acre	100 gallons /acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate
[2]Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Hold treatments are made when the nursery has a viable GWSS find in a shipment at destination. This would be a nursery with either an infested premise or a free-from premise compliance agreement. The second situation is a nursery in an infested county with trap finds that are over the maximum threshold for finds in the nursery. If either situation happens the nursery must treat all plants within 100 feet of the finds, or the block of plants where the GWSS-infested plant originated.
- Plants can be treated no more than twice per year.
- Re-entry signs are posted around treated plants.
- The Restricted Entry Interval (REI) is 12 hours.
- Applying 10.5 fl oz of Altus / 100 gallons /acre
- Minimize exposure to pollinators by applying outside of daily peak foraging periods.

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

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(CDFA): S. Oswalt Date: 5.15.20

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(Blankinship): J. Sullivan Date: 5/28/20

Scenario Name: PDCP-82

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Large Production Nursery	Containerized Nursery Stock	Southern California

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery Stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Soil, drift to nontarget nursery plants	Foliar spray	Mechanically pressurized handgun sprayer, boom sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
2	6 months	130 acres	50 acres

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz / acre	100 gallons /acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate

[2] Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Board treatments occur where nurseries, if they meet specific requirements, can receive a pesticide treatment that is reimbursed by the CDFA PD/GWSS Board. Quite often these treatments involve the aerial application of a pesticide having systemic or translaminar properties. The average size of these nurseries over the past few years has been about 130 acres. Treatments using Altus are done at most twice a year, with 12 nurseries qualifying. The products used for these treatments are those listed on the nursery PMDS as being applied using “aerial” or “foliar” methods.
- Plants can be treated no more than twice per year.
- Re-entry signs are posted around treated plants.
- The Restricted Entry Interval (REI) is 12 hours.
- Applying 10.5 fl oz of Altus / 100 gallons /acre
- Minimize exposure to pollinators by applying outside of daily peak foraging periods.

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

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☒Reviewed, ☐ Revised, ☐ Approved by:
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(Blankinship): J. Sullivan Date: 5/28/20

Scenario Name: PDCP-83

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Large Production Nursery	Containerized Nursery Stock	Southern California

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery Stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Soil, drift to nontarget nursery plants	Foliar spray	Aerial

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
2	6 months	130 acres	50 acres *

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz / acre	100 gallons /acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate

[2] Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

*As of September 29th, 2020, Stacie Oswalt of CDFA indicated via personal communication that the area treated/applicator/day is 130 acres

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Board treatments occur where nurseries, if they meet specific requirements, can receive a pesticide treatment that is reimbursed by the CDFA PD/GWSS Board. Quite often these treatments involve the aerial application of a pesticide having systemic or translaminar properties. The average size of these nurseries over the past few years has been about 130 acres. Treatments using Altus are done at most twice a year, with 12 nurseries qualifying. The products used for these treatments are those listed on the nursery PMDS as being applied using “aerial” or “foliar” methods.
- Plants can be treated no more than twice per year.
- Re-entry signs are posted around treated plants.
- The Restricted Entry Interval (REI) is 12 hours.
- Applying 10.5 fl oz of Altus / 100 gallons /acre.
- Minimize exposure to pollinators by applying outside of daily peak foraging periods.

California Department of Food & Agriculture Program Material Data Sheet (PMDS)

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Oswalt** Date: 5/22/20

☒Reviewed, ☒ Revised, ☐ Approved by:
Mike Blankinship
(Blankinship): Date: 6/1/20

☒Reviewed, ☐ Revised, ☒ Approved by:
(CDFA): Stacie Oswalt Date: 6/1/20

☒ Reviewed, ☐ Revised, ☒ Approved by:
Mike Blankinship: Date: 6/1/20

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐Reviewed, ☐ Revised, ☐ Approved by:
(Blankinship): Date:

Scenario Name: PDCP-84

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Altus	No	Flupyradifurone	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium and Most Large Production Nursery	Containerized nursery stock on indoor loading dock	Statewide

Trapping Scenario (if yes, Describe on Page 2)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery Stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Loading dock surface (concrete, soil)	Foliar spray	Mechanically pressurized sprayer, backpack sprayer.

Application(s) per year	Application Interval (If variable, explain on page 2)	Total Contiguous Application Area	Area Treated/Applicator/Day
24	15 days	3750 sq. ft.	3750 sq. ft.

Product Application Rate (Please include units)	Final Tank Mix Applied (Volume per Area)	Active Ingredient Application Rate (Provided by Consultant)	Inert Ingredient Application Rate(s) (Provided by Consultant)
10.5 fl. oz / acre	100 gallons /acre	0.137 lbs. a.i./ac	Prop. carbonate-0.343 lb/ac[1] Oxirane-0.320 lb/ac[2]

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate (Please include units)
None	NA

[1]Prop. Carbonate = Propylene carbonate

[2] Oxirane = Oxirane, methyl-, polymer with oxirane, monobutyl ether

Program Material Data Sheet (PMDS)

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Each plant receives a single application on indoor loading dock prior to shipment.
- Plants are not loaded onto shipping trucks until the REI period has elapsed.
- Loading consist of either palleted plants or individuals pots manually lifted.
- Treated host plants on loading docks are isolated from other nursery stock or other nontarget plants.
- Re-entry signs are posted around treated plants.
- The Restricted Entry Interval (REI) is 12 hours.
- Applying 10.5 fl oz of Altus / 100 gallons /acre