Print Form

Notice of Determination

Appendix D

To:
☒ Office of Planning and Research

U.S. Mail:	*Street Address:*
P.O. Box 3044	1400 Tenth St., Rm 113
Sacramento, CA 95812-3044	Sacramento, CA 95814

☐ County Clerk
County of: ______
Address: ______

From:
Public Agency: CA. Dept. of Food & Agriculture
Address: 1220 N Street, Rm 221
Sacramento, CA 95814
Contact: Laura Petro
Phone: 916-654-0317

Lead Agency (if different from above):

Address: ______

Contact: ______
Phone: ______

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2011062057

Project Title: Statewide Plant Pest Prevention & Management Program EIR (PEIR) - Addendum No. 2

Project Applicant: California Department of Food & Agriculture - Plant Health & Pest Prevention Services Division

Project Location (include county): Statewide

Project Description:
Addendum No. 2 to the PEIR certified on December 24, 2014. CDFA proposes changing the PEIR to include Acelepryn residential/urban foliar and ground applications for the Japanese Beetle Program. These are minor modifications to the PEIR within CDFA's jurisdiction, will be subject to management practices and mitigation measures described in the PEIR, & will result in no additional significant environmental impacts beyond those already identified in the PEIR. (CEQA Guidelines, 15164, 15162, 15163) The Addendum includes an evaluation & explanation of the decision not to prepare a subsequent EIR supported by substantial evidence. (Guidelines 15164(b)(d)(e).)

This is to advise that the California Department of Food & Agriculture has approved the above
(☒ Lead Agency or ☐ Responsible Agency)

described project on 4/17/17 (date) and has made the following determinations regarding the above described project.

1. The project [☒ will ☐ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☒ was ☐ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:

______

Signature (Public Agency): Laura Petro   Title: Environmental Program Manager I

Date: 4/17/17   Date Received for filing at OPR:

Governor's Office of Planning & Research
APR 17 2017
STATE CLEARINGHOUSE

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

Statewide Plant Pest Prevention and Management Program EIR (PEIR)
ADDENDUM NO. 2

1. Introduction

This document is Addendum No 2. (Addendum) to the Statewide Plant Pest Prevention and Management Program Environmental Impact Report (PEIR) prepared by the California Department of Food and Agriculture (CDFA). The PEIR is intended to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the implementation of the Statewide Plant Pest Prevention and Management Program (Statewide Program). The PEIR was prepared in compliance with the California Environmental Quality Act (CEQA) of 1970 (as amended) and the State CEQA Guidelines (Title 14, California Code of Regulations, § 15000 et seq.) (CEQA Guidelines). The PEIR was certified on December 24, 2014 by the Secretary of CDFA, Karen Ross. CDFA was the Lead Agency, and a Notice of Determination was filed with the Office of Planning and Research.

CDFA is proposing to change the PEIR and Japanese Beetle Program in the Statewide Program to include the foliar and ground application of Acelepryn® to turf, mulch, bare soil, and plants in residential/urban settings. Under CEQA, an addendum may be prepared when changes are proposed to a project that has already been approved, and those changes will not result in new significant impacts or a substantial increase in the severity of previously identified significant impacts. (CEQA Guidelines, §§ 15162, 15163, 15164.) This Addendum evaluates whether any new significant impacts or a substantial increase in the severity of previously identified significant impacts would result from implementation of the proposed change.

2. Purpose of Addendum

The purpose of this Addendum is to include the foliar and ground application of Acelepryn® to turf, mulch, bare soil, and plants in residential/urban settings into the Japanese Beetle Program in the PEIR. Under CEQA, the lead agency or a responsible agency shall prepare an addendum to a previously-certified EIR if some changes or additions are necessary to the prior EIR, but none of the conditions calling for preparation of a subsequent or supplemental EIR have occurred. (CEQA Guidelines, § 15164.) Once an EIR has been certified, several approaches can be used to achieve CEQA compliance for specific activities. A subsequent EIR is only required when the lead agency or responsible agency determines that one of the following conditions has been met:

(1) Substantial changes are proposed in the project, or substantial changes occur with respect to the circumstances under which the project is undertaken, which require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects (CEQA Guidelines, § 15162 (a)(1),(2));

(2) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows any of the following:

a. The Project will have one or more significant effects not discussed in the previous EIR;

b. Significant effects previously examined will be substantially more severe than shown in the previous EIR;

c. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

d. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measures or alternatives

(CEQA Guidelines, § 15162(a)(3).)

If one or more the conditions described above for a subsequent EIR exist, but only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation, then the lead agency may prepare a supplement to an EIR rather than a subsequent EIR. (CEQA Guidelines, § 15163(a).)

A CEQA Addendum is the appropriate CEQA compliance document when changes or additions are necessary to an EIR, but none of the conditions described in Section 15162 calling for preparation of a subsequent EIR have occurred. (CEQA Guidelines, § 15164(a).) The CEQA Guidelines recommend that a brief explanation of the decision to prepare an addendum rather than a subsequent or supplemental EIR be included in the record. (CEQA Guidelines, § 15164(e).)

This Addendum has been prepared because the proposed modifications to the PEIR do not meet the conditions for a subsequent or supplemental EIR. This Addendum explains why the proposed modifications would not result in new significant environmental effects or result in a substantial increase in the severity of previously-identified significant effects. There is no new information demonstrating that the proposed modifications would have new effects or more severe effects on the environment or would change the conclusions of the previously-certified PEIR.

An addendum does not need to be circulated for public review, but rather can be attached to the final EIR. (CEQA Guidelines, § 15164(c).) Prior to initiating the modified Project, CDFA will consider this Addendum together with the PEIR and make a decision regarding the modified Project. (CEQA Guidelines, § 15164(d).)

3. Statewide Program Environmental Impact Report Overview

CDFA is mandated to prevent the introduction and spread of injurious insect or animal pests, plant diseases and noxious weeds in California. (Food & Agr. Code, § 403.) To accomplish this, CDFA implements the Statewide Program, an ongoing effort to protect California's agriculture and the environment from the damage caused by invasive plant pests.

The Statewide Program encompasses a range of phytosanitary measures for the purpose of preventing the introduction and/or spread of quarantine pests or limiting the economic impact of regulated non-quarantine pests. The activities include prevention, exclusion, management, and control carried out or overseen by CDFA against specific injurious pests and their vectors, throughout California.

Program activities may occur anywhere that a pest is (or may be) found in agricultural or nursery settings (in cooperation with commercial growers), in residential communities, at California Border Protection Stations and sometimes outside California (for activities conducted by others besides CDFA, in response to restrictions on the importation of potentially infested commodities and equipment from outside the state). The location, area and extent of specific activities under the Statewide Program ultimately would be evaluated based on the site-specific situation and dictated by the target pest, the regulatory requirements and management approaches available for response.

Activities that would be conducted under the Statewide Program include pest risk analysis (evaluation of the pest's environmental, agricultural, and biological significance), identification, detection and delimitation of new pest populations, and pest management required responses that may include rapid eradication, suppression or containment, including the prevention of the movement of plant pests into and within California.

The Statewide Program falls under the CDFA Plant Health and Pest Prevention Division. The Division is divided into four branches. All phytosanitary measures related to pest management activities are carried out or overseen by one of the branches under the oversight of the Division Director. The four branches are:

- **Plant Pest Diagnostics Branch**, a scientific resource for providing information on pests and making all official identifications and diagnoses for suspect pests and diseases;
- **Pest Detection/Emergency Projects Branch**, initiates and operates programs which carry out phytosanitary procedures of control including suppression, containment or eradication and treatments of priority pests to prevent establishment;
- **Pest Exclusion**, initiates prevention and exclusion to keep priority pests out of California and to prevent or limit the spread of newly discovered pests in the role of quarantine regulatory compliance and service to the agricultural industry and the public; and
- **Integrated Pest Control Branch,** conducts a wide range of pest management and eradication programs in cooperation with growers, county agricultural commissioners and federal and state agencies and non-governmental organizations.

The Statewide Program is ongoing, and future activities that may be conducted following the CEQA process are referred to as the "Proposed Program." The PEIR evaluated the potential environmental impacts that could result from the implementation of the range of activities that CDFA may conduct or oversee as part of the Statewide "Proposed Program." The PEIR serves as a program-level, first-tier document, and also provided project-level detail where it was feasible to do so. The PEIR was intended to be a flexible and efficient foundation to facilitate implementation of the Statewide "Proposed Program" activities and, if needed, preparation of a tiered, project-level CEQA analysis. Such future activities include both the Statewide "Proposed Program" activities that are specifically identified in the PEIR, as well as other pest prevention and management activities not specifically identified in the PEIR.

As part of the PEIR, seven application scenarios were analyzed in the Pest Detection/Emergency Projects Program (PD/EP) Activities. These application use scenarios include type of chemical, concentration of chemical, application method, rate of application, area of application settings, and duration/frequency of application. The chemical use scenarios were uniquely identified by program name, chemical and identifying number. An example would be PD/EP-E-01. For further information please refer to the Statewide PEIR (Volume 1, Main Body & Volume 3, Appendix B). The chemical Acelepryn®, the treatment equipment (mechanically pressurized sprayer), and the setting (urban/residential) were previously analyzed in the PEIR.

4. Proposed Modification to Statewide Program Scenario

As identified in the PEIR, to prevent the entrance of Japanese Beetle in California, CDFA currently enforces the Japanese Beetle Exterior Quarantine, Title 3 of the California Code of Regulations, Section 3280, restricting movement of host commodities and possible carriers. CDFA also enforces the Japanese Beetle Federal Domestic Quarantine, Title 7 of the Code of Federal Regulations, Section 301.48. CDFA has an active eradication program in place for any incipient populations of Japanese Beetle per the requirements of the U.S. Domestic Japanese Beetle Harmonization Plan.

CDFA conducts statewide detection trapping to intercept Japanese Beetle, and a single beetle find in a trap may trigger a delimitation survey to further identify the significance of the find. If further detection and trapping indicates that Japanese Beetle may be present in numbers or life stages above a specific threshold, and eradication is determined to be feasible, an eradication project may be initiated. The PEIR's Japanese Beetle Program description and analysis included foliar and soil applications with respect to Japanese Beetle residential treatments. Currently, the PEIR describes the PDEP-E-04 scenario using Merit® 2F Insecticide that can be applied as a soil drench using a backpack sprayer or mechanically pressurized system. Additionally, CDFA added the Merit® 2F Residential Turf Eradication Scenario described as PDEP-E-08. Merit®2F can be applied as a spray drench to turf and ground cover and under host plants using a backpack sprayer or mechanically pressurized system.

CDFA is proposing to include the foliar and ground application of Acelepryn® to turf, mulch, bare soil, and plants in residential/urban settings into the Japanese Beetle Program in the PEIR utilizing Acelepryn® for several reasons, including: input from sister agencies, input from the Japanese Beetle Scientific Advisory Committee, biological life stages of the Japanese Beetle and technical review of safe and efficacious options under the U.S. Domestic Japanese Beetle Harmonization Plan (January 2017) for regulatory control of the Japanese Beetle. The Japanese Beetle is a destructive plant pest, both in the immature life stage of grubs (larvae) and in the adult life stage. Adults feed on the foliage and fruits of several hundred species of fruit trees, ornamental trees, shrubs, vines and field and vegetable crops. Adults leave behind skeletonized leaves and large irregular holes in leaves. The grubs develop in the soil, feeding on the roots of various plants and grasses and often destroying turf in lawns, parks, golf courses, and pastures. Today, the Japanese Beetle is the most widespread turf-grass pest in the United States. Efforts to control the larval and adult stages are estimated to cost more than $460 million a year. Losses attributable to the larval stage alone have been estimated at $234 million per year - $78 million for control costs and additional $156 million for replacement of damaged turf.

The $78 million for control costs represents increased pesticide use in areas east of the Rocky Mountains where Japanese Beetle is established and there is no attempt to eradicate it as it is not feasible. These are the pest control management costs that come with having to "live with" the Japanese Beetle. The Japanese Beetle has severe impacts on our urban/residential environment affecting homeowners, and it is critical to be able to address all of the life stages of the Japanese Beetle (i.e. eggs, larvae, pupae and adult).

Based on input from sister agencies and the CDFA's Japanese Beetle Science Advisory Panel (JBSAP) recommendations for Japanese Beetle control in December 2015, as well as technical science review of the safe and efficacious options for regulatory control of Japanese Beetle, CDFA is proposing to include foliar and ground application of Acelepryn® to turf, mulch, bare soil, and plants in residential/urban settings into the Japanese Beetle Program description. Foliar and turf applications are similar to the foliar, turf and soil applications already analyzed in the PEIR and Merit® 2F Residential Turf Applications (Addendum No. 1) because they use the same backpack sprayer or mechanically pressurized system. The application of Acelepryn® could occur in residential settings which include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, industrial buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, day care facilities, golf courses, athletic fields and other landscaped areas. A mechanically pressurized sprayer, backpack sprayer or hand pump is typically used in residential settings. Additionally, larger areas such as school athletic fields or cemeteries could receive applications made with a small low pressure boom sprayer.

CDFA will follow existing management practices and mitigation measures for activities conducted under the PEIR including general management practices such as conducting a site assessment, following appropriate treatment procedures, training personnel in proper use of pesticides, and enforcing runoff and drift prevention. (See Statewide PEIR, Volume 1 Main Body, Section 2.11 Program Management Practices.)

The addition of the Japanese Beetle foliar and turf treatments with Acelepryn® would be added as PD/EP-E-09 & PD/EP-E-10 scenarios, a residential/urban setting foliar treatment and a residential/urban setting turf, mulch and bare soil treatment. The Human Health (HHRA) and Ecological Risk Assessments' (ERA) (Appendix 2A) analysis of PD/EP-E-09 and PD/EP-E-10 provides substantial evidence that the proposed modification would not have any adverse environmental effects and would not change the conclusions of the previously-certified Final PEIR. (See Appendix 2A, Executive Summary HHRA and ERA, Problem Statement HHRA and ERA and Conclusions.)

5. Analysis of Potential Environmental Impacts Associated with the Proposed Modifications

Appendix 2A includes an ERA and HHRA. The ERA and HHRA were conducted to determine if the Acelepryn® PD/EP-E-09 and PD/EP-E-10 residential/urban setting foliar and turf application scenarios would result in any additional or more severe environmental impacts other than those addressed in the PEIR. These scenarios were analyzed as a foliar application using a mechanically pressurized spray with low pressure application and a turf, mulch, plants and bare soil spray drench application using a mechanically pressurized sprayer with low pressure application with Acelepryn® for the eradication of Japanese Beetle. The methods used in the ERA and HHRA largely follow those methods used in the previous risk assessments in the PEIR. Where methods differ, the new assumptions or receptors are discussed in the assessments.

The Acelepryn® Residential Foliar and Turf ERA along with the PEIR were used to assist CDFA in assessing the potential to affect particular species and develop site-specific measures to protect these species. This ERA did not identify new significant effects beyond those identified in the PEIR. No alterations or mitigation measures to the PD/EP-E-09 and PD/EP-E-10 scenarios that were not already indicated for other scenarios in the Statewide PEIR are recommended for the protection of biological resources. (See Appendix 2A ERA.)

The Acelepryn® Residential Foliar and Turf HHRA along with the PEIR were used to assist CDFA in assessing potential impacts to human health. The HHRA did not identify any new significant human health impacts or any substantial increase in the severity of the significant effects identified in the PEIR. No alterations to PD/EP-E-09 and PD/EP-E-10 that were not already indicated for other scenarios in the PEIR are recommended. (See Appendix 2A HHRA).

6. Conclusions

The Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program, Ecological and Human Health Risk Assessment did not identify any new significant environmental effects or a substantial increase in the severity of the significant effects identified in the PEIR. (See Appendix 2A.)

7. References

"Action Plan for Japanese Beetle, *Popillia japonica* (Newman)", May 2000, California Department of Food and Agriculture, Plant Health and Pest Prevention Services.

California Department of Food and Agriculture. 2016. Japanese Beetle Page (JB). (Accessed December 23, 2016): https://www.cdfa.ca.gov/plant/JB/index.html.

Japanese Beetle California Exterior Quarantine, Section 3280, Title 3, California Code of Regulations.

Japanese Beetle Federal Domestic Quarantine, Section 301.48, Title 7, Code of Federal Regulations.

"Merit® 2F Residential Turf, Japanese Beetle Eradication Program, Human Health and Ecological Risk Assessment", May 2016. Blankinship & Associates, Inc. (Accessed December 23, 2016): https://www.cdfa.ca.gov/plant/peir/docs/addenda/SPPPMP-Addendum-No-1.pdf

"Statewide Plant Prevention and Management Program Environmental Impact Report", certified December 24, 2014, California Department of Food and Agriculture, Plant Health and Pest Prevention Services. (Accessed December 23, 2016): http://www.cdfa.ca.gov/plant/peir/.

U.S. Domestic Japanese Beetle Harmonization Plan", Current Plan Ending December 31, 2016; New Effective January 1, 2017. National Plant Board. (Accessed December 23, 2016): http://nationalplantboard.org/japanese-beetle-harmonization-plan/.

Appendix 2A

California Department of Food and Agriculture
Statewide Plant Pest Prevention and Management Program

Ecological and Human Health Risk Assessments

Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program

Prepared for:

California Department of Food and Agriculture
1220 N Street
Sacramento, CA 95814

Contact:
Laura Petro
(916) 654-0317

Prepared by:

Blankinship & Associates, Inc.
1590 Drew Ave, Suite 120
Davis, CA 95618

Contact:
Mike Blankinship
530-757-0941

and

Ardea Consulting
10 1st Street
Woodland, CA 95695

Contact:
Joseph P. Sullivan, Ph.D.
(530) 669-1645

March 10, 2017

Appendix 2A

Contents

Appendix 2A

Tab 1:

Ecological Risk Assessment (62 pages)

Appendix 2A

California Department of Food and Agriculture
Statewide Plant Pest Prevention and Management Program

Ecological Risk Assessment

Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program

Prepared for:

California Department of Food and Agriculture
1220 N Street
Sacramento, CA 95814

Contact:
Laura Petro
(916) 654-0317

Prepared by:

Joseph P. Sullivan, Ph.D.
Primary Author
Ardea Consulting
10 1st Street
Woodland, CA 95695

and

Blankinship & Associates, Inc.

1590 Drew Ave, Suite 120
Davis, CA 95618

Contact:
Mike Blankinship
530-757-0941

March 10, 2017

Appendix 2A

TABLE OF CONTENTS

Appendix 2A

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Appendix 2A

LIST OF ABBREVIATIONS

a.i. .... Active Ingredient
AQ .... Aquatic
AUF .... Area Use Factor
BMF .... Biomagnification Factor
BMP .... Best Management Practices
bw .... Body Weight
CDFA .... California Department of Food and Agriculture
CSM .... Conceptual Site Model
CDFW .... California Department of Fish and Wildlife
DPR .... California Department of Pesticide Regulation
C_w .... Water Concentration
dw .... Dry Weight
ED_{50} .... Median Effective Dose
EC_{50} .... Median Effective Concentration
EEC .... Estimated Environmental Concentration
EIR .... Environmental Impact Report
ERA .... Ecological Risk Assessment Report for Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program
ESU .... Evolutionary Significant Units
EXAMS .... Exposure Analysis Modeling System
f_{oc} .... Fraction of Organic Carbon
FIFRA .... Federal Insecticide, Fungicide and Rodenticide Act
ha .... Hectacre
KABAM .... K_{ow} Aquatic BioAccumulation Model
K_d .... Soil-Water Partition Coefficient
K_{oc} .... Organic Carbon Absorption Coefficient
K_{ow} .... Octanol-Water Partition Coefficient
LC_{50} .... Median Lethal Concentration, 50%
LD_{50} .... Median Lethal Dose, 50%
LO(A)EL/LOAEL .... Lowest Observable (Adverse) Effect Level
LOC .... Level of Concern

Appendix 2A

Merit 2F Assessment .... Statewide Plant Pest Prevention and Management Program EIR (PEIR) - Addendum No. 1, SCH # 2011062057 (CDFA, 2016a)

MW .... Molecular Weight

NA .... Not Applicable

NMFS .... National Marine Fisheries Service

NOAEL/NO(A)EL .... No Observable (Adverse) Effect Level

NOAEC/NO(A)EC .... No Observable (Adverse) Effect Concentration

NPDES .... National Pollutant Discharge Elimination System

OEHHA .... Office of Environmental Health Hazard Assessment

PD/EP-E .... Pest Detection/Emergency Projects - Eradication

PE5 .... PRZM-EXAMS Model Shell Version 5.0

PEIR .... Programmatic Environmental Impact Report

PMDS .... Program Material Data Sheet

PRZM .... Pesticide Root Zone Model

RQ .... Risk Quotient

SDS .... Safety Data Sheet

Statewide PEIR .... California Department of Food and Agriculture (CDFA). 2014a. Statewide Plant Pest Prevention and Management Program Environmental Impact Report SCH # 2011062057

SWCC .... Surface Water Concentration Calculator

T&E LOC .... Threatened and Endangered (Species) Level of Concern

TE .... Terrestrial

T-REX .... Terrestrial Residue Exposure

TRV .... Toxicity Reference Value

TSCF .... Transpiration Stream Concentration Factor

TWA .... Time Weighted Average

USEPA .... U.S. Environmental Protection Agency

USFWS .... United States Fish and Wildlife Service

VUF .... Vegetation Uptake Factor

VVWM .... Variable Volume Water Body Model

Appendix 2A

Executive Summary

This Ecological Risk Assessment (ERA) is conducted as a supplement to the ERA conducted as part of the Statewide Plant Pest Prevention and Management Program Environmental Impact Report (Statewide PEIR) (CDFA, 2014a). Two new scenarios for turf spray drench or foliar applications with Acelepryn® for the eradication of Japanese Beetles were assessed. The methods used in this risk assessment largely follow those methods used in the previous risk assessment in the Statewide PEIR (CDFA, 2014a). Where methods differ, the new assumptions or receptors are discussed.

The application of Acelepryn® could occur in residential/urban settings within a 200 meter radius around beetle detections and includes ground application to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil). Residential/urban settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. A mechanically pressurized sprayer, backpack sprayer or hand pump is typically used in residential settings; sports fields or other large areas may be treated using a boom sprayer. Spray equipment can be adjusted for low pressure applications close to the ground to reduce or eliminate spray drift. Applications are followed by "watering in" of Acelepryn® through "thatch" and into the soil immediately following a turf spray drench application using similar spray equipment. No adjuvants were included in the application scenarios analyzed.

If adult Japanese beetles are found outside of detection traps, a foliar spray application can be made using mechanically pressurized sprayers, hand sprayers, or backpack sprayers. Applications could be made to ornamental plants and trees (up to 30 ft. into the canopy), as well as landscaped areas including flowers and containerized plants.

Similar methods were used to identify toxicity endpoints as were used for the Statewide PEIR (CDFA, 2014a). Similar surrogate species were used with the addition of being able to assess chronic effects on insects such as the honey bee since new assessment methods have been developed. Where appropriate and necessary, assumptions regarding exposure routes were used due to the somewhat unique nature of a turf application with the pesticide initially applied directly to foliage to be washed off into the soil beneath. Updated U.S. Environmental Protection Agency (USEPA) models such as the Surface Water Concentration Calculator were used in an effort 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, the California Department of Food and Agriculture (CDFA) and its risk assessment team consulted with the Department of Pesticide Regulation (DPR) and the Office of Environmental Health Hazard Assessment (OEHHA) to determine the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxicity effects representations. The problem formulation stage concluded with a Conceptual Site Model (CSM) that identified the complete exposure pathways carried forward in the analysis based on information that was available to evaluate the potential exposure pathway. 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 toxicity properties of the chemicals along with safety factors used 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), it was concluded that the potential for adverse effects is 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.

In some situations where the quantitative assessment indicated the RQ was below the LOC, it was concluded that the potential for adverse effects was low. When the RQ was above the LOC, several qualitative considerations typically resulted in a conclusion that the potential for adverse effects would be low. This includes an assessment of the potential for species presence at an actual site, incorporation of foraging range and diet, in addition to fate and transport processes such as dilution and degradation.

In the ERA, a few groups of ecological receptors were found to have RQs that exceeded LOCs. These include insectivorous birds and aquatic invertebrates. CDFA's BMPs (Best Management Practices) are designed to greatly reduce, if not eliminate, movement to surface water. Therefore, actual impacts to aquatic invertebrates are anticipated to be minimal. It is unclear whether birds that consume flying insects, such as the purple martin, could be exposed to the extent suggested by the models used. Insects with residues sufficient to be harmful for birds might be unable to emerge or to fly, and therefore would be unavailable as food for flying insectivorous birds. Most insects, such as flying insects, would receive limited exposure. Thus, most insects and insectivorous species are anticipated to be exposed to a limited extent and impacts would be minimal.

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.

Appendix 2A

1 Introduction

This Ecological Risk Assessment (ERA) is for two application scenarios within the California Department of Food and Agriculture's (CDFA) Pest Detection/Emergency Program (PD/EP) for the eradication of Japanese Beetles in an urban setting, herein referred to as the "Proposed Program". This document is a supplement to the CDFA Statewide Plant Pest Prevention and Management Program Environmental Impact Report. SCH # 2011062057 (Statewide PEIR) (CDFA, 2014a).

1.1 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 chemical applications that may be conducted under the Proposed Program to eradicate Japanese beetle. The ERA evaluates the potential risk to terrestrial and aquatic species following such chemical applications.

1.2 Approach

A detailed discussion of the approach for the ERA process is provided in the Statewide PEIR, Volume 2 – Appendix A, Ecological Risk Assessment (CDFA, 2014a).

This ERA was conducted by using models and exposure data developed primarily by the USEPA in the context of typical application methods and settings in California. The ERA depends on these USEPA exposure models to estimate environmental concentrations and risk estimates in lieu of observed adverse effects. The majority of these models, described in detail in the applicable sections of the Statewide PEIR (CDFA, 2014a), are Microsoft Excel-based user interface packages which allow for input of information specific to the Proposed Program, as well as default data when site-specific data is not available. Since multiple models were required for this ERA and some models require the output of other models as its 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 is referred to as the Comprehensive Risk ANalysis Kalculator (CRANK), providing a consolidated tool to estimate risk for the ERA (as well as the Human Health Risk Assessment).

To present information that serves as inputs for the various models used in this ERA in an organized and efficient manner, a Microsoft Access database with a custom user interface was created. This Microsoft Access database is referred to as the **Dashboard Database**.

The database specifically contains the following information that is not available in this report:

- Physical 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})
- Summary of active ingredient fate characteristics and environmental effects based on published literature
- Size of species home and foraging ranges

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

2 Problem Formulation

Problem formulation is the first step in the ERA process. Its purpose is 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 DPR and OEHHA during the problem formulation to facilitate the exchange of information to ensure this ERA meets both the public outreach and scientific goals desired by CDFA for the Proposed Program.

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

2.1 Chemical Use Scenarios

Details regarding the application of chemicals 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.*, agriculture, residential)

The primary objectives of the Pest Detection/Emergency Program (PD/EP) are the early detection and prompt eradication of serious agricultural pests from California including, but not limited to, exotic fruit flies, Japanese beetle, and gypsy moth. Eradication activities conducted under PD/EP are performed under the Pest Detection/Emergency Program – Eradication (PD/EP-E). Activities vary based on target pest and include pesticide applications in a residential setting.

As part of the Statewide PEIR (CDFA, 2014a), seven application scenarios were analyzed in the PD/EP. An additional scenario was analyzed since the PEIR was completed for applications to turf in a residential setting. The application scenarios analyzed in this ERA were not substantially similar to any of those scenarios. In the PEIR, two scenarios with Acelepryn® were analyzed. Both of the scenarios analyzed in the PEIR were in nurseries. Two new application scenarios are being analyzed in this ERA, as well as an analysis for the possibility that both scenarios occur in the same location on the same day.

In this assessment, a single pesticide, Acelepryn®, was applied in residential/urban settings within a 200 meter radius around beetle detections and includes ground application to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil). Residential/urban settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. A mechanically pressurized sprayer, backpack sprayer or hand pump is typically used in residential settings; sports fields or other large areas may be treated using a boom sprayer. Spray equipment can be adjusted for low pressure applications close to the ground to reduce or eliminate spray drift. Applications are followed by "watering in" of Acelepryn® through "thatch" and into the soil immediately following a turf spray drench application using similar spray equipment. No adjuvants were included in the application scenario analysis.

If adult Japanese beetles are found outside of detection traps, a foliar spray application may be made using mechanically pressurized sprayers, hand sprayers, or backpack sprayers. Applications could be made to ornamental plants and trees (up to 30 ft. into the canopy), as well as landscaped areas including flowers and containerized plants. Up to four applications may be made per year at a 21-day re-treatment interval.

Although unlikely, it is possible that it might be necessary to make both a foliar application to eradicate adult Japanese beetles and a spray drench application to turf to eradicate the soil-dwelling immature life stages. Analyses were performed to address the possibility that a foliar application of Acelepryn® was made in an area also treated with a spray drench application to turf using Acelepryn®.

In a manner similar to what was done in the Statewide PEIR (CDFA, 2014a), CDFA defined the product application rate and other application specifics for the scenario PD/EP-E-09 and PD/EP-E-10 in the Program Material Data Sheet (PMDS) found in **Appendix Eco-D - PMDS**. The defined application rate in PD/EP-E-09, a foliar application of Acelepryn®, is 0.136 lb. chorantraniliprole/acre. The defined application rate in PD/EP-E-10, a spray drench application of Acelepryn® to turf, is 0.273 lb. chorantraniliprole/acre.

2.2 Active and Inert Ingredients of Concern and Environmental Fate Properties

The risk assessment team investigated the Acelepryn® label and Safety Data Sheet (SDS) to determine the list of active and inert ingredients. No inert ingredients for Acelepryn® were found. Acelepryn® contains 18.4% chorantraniliprole. Note that inert ingredients are often considered confidential business information and are consequently not available to the public. No other chemicals were listed on the label or SDS and therefore could not be evaluated. The active ingredient was researched for chemical characteristics, including toxicity, as well as its environmental fate properties. All environmental fate characteristics for chorantraniliprole can found in the relevant sections of the Dashboard Database associated with the Statewide PEIR (CDFA, 2014a).

2.3 Environmental and Ecological Settings

The chemical use scenario evaluated as a foliar application evaluated in this ERA for PD/EP-E-09 may be applied to foliage of ornamental plants and trees/landscaped areas including flowers and containerized plants. No applications are made to edible plants, including fruit or nut trees. Application height could be to a maximum of 30 ft. into tree canopy. Applications may be made to residential/urban settings that include: ground application to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil), home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas.

The chemical use scenario of a spray drench application to turf evaluated in this ERA for PD/EP-E-10 may include the same residential/urban settings as described above.

To determine the types of species which 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, was investigated. A more detailed discussion of the Environmental and Ecological Settings can be found in the Statewide PEIR (CDFA, 2014a).

2.4 Assessment Endpoints and Measures of Ecological Effect

An endpoint is a characteristic of an ecological receptor, 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 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 did not 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 intends 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.

2.4.1 Assessment Endpoints

Three principal criteria are 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 are essential for selecting assessment endpoints that are scientifically defensible (USEPA, 1998g). Although stressors can consist of many different environmental factors, the stressors addressed in this ERA are those effects related to chemical exposure. This ERA's endpoints focus on organism-level outcomes. These include 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 this ERA for the Proposed Program include the prevention of mortality in:

1. Soil-dwelling invertebrates, non-target insects, aquatic 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 reptiles, birds, and mammals.

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

Typically, reproduction is a more sensitive endpoint than survival, thus this endpoint has been 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.

2.4.2 Measurement Endpoints

In terms of measurement endpoints, measures of exposure have been used to evaluate levels at which exposure may occur whereas measures of effect have been used to evaluate the response of the assessment endpoints if exposed to stressors. Concentration of a chemical in water is a measure of exposure for an aquatic species, and daily intake of a chemical in dietary items is a measure of exposure for terrestrial species. The concentration in water or the amount of daily ingestion of chemical that causes adverse effects are 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 chemical application. The likelihood of presence at the application site is 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 a risk to ecological receptors. The way in which TRVs are developed depends on available data on a chemical's toxicological effects and commonly accepted assumptions that address uncertainty regarding the available data. TRVs are developed according to a highly structured and demanding 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 the adverse effect. TRVs are used to represent measurement endpoints of the environmental concentrations or daily doses (mg/kg bw-day) with uncertainty factors incorporated, such that values above the TRV are likely to cause adverse effects for a species. If the estimated environmental concentration (EEC) or the daily dose of a chemical exceeds the TRV, concern is triggered regarding the potential for an adverse effect to an organism.

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}).

The methods for developing TRVs for the chemicals and species evaluated in this ERA are described in Section 4 of the ERA as part of the Statewide PEIR (CDFA, 2014a). These TRVs were the measurement endpoint for that 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 was the species often used to derive an appropriate TRV. For reptiles and terrestrial-phase amphibians, bird toxicity values act in place of specific toxicity values for reptile or terrestrial amphibian species (USEPA, 2004j).

2.5 Surrogate Species Selection

A very large number of species occur in California. This ERA does not assess risk for every one of these 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.

2.6 Conceptual Site Models

Development of 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 which were evaluated for the chemical use 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 chemical would be expected to travel from a source (application of chemical) to a plant or animal that can be affected by that chemical. An exposure pathway that is not complete means that it is unlikely for that organism to be exposed to the chemical by that means. Application-specific CSMs are presented below.

The ecological CSM covers the multiple pathways through which ecological receptors could be exposed to active and inert ingredients 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 chemical into the environment. The possible pesticide application technique addressed in this ERA for PD/EP-E-09, a foliar spray application and PD/EP-E-10 is a spray drench through turf and ornamental ground cover.

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

2.6.1 Pest Detection/Emergency Programs (PD/EP)

Figure Eco-1 provides details for foliar applications that can occur in urban/residential settings (PD/EP-E-09). 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. Exposure pathways for terrestrial vertebrates were complete for dermal contact and ingestion of surface water, vegetation, and soil. Adequate exposure and toxicity data existed only for the ingestion pathway, so the dermal, although potentially complete, was not considered. The exposure to terrestrial insects was complete for exposure via ingestion of treated foliage, pollen or nectar, and toxicity data were available so this pathway was analyzed. The exposure pathway for fish and aquatic invertebrates was complete via surface water following deposition from drift or from movement through or over soil beneath treated plants, but adequate toxicity data for ingestion of contaminated food items or ingestion of water did not exist, so only effects from exposure from immersion in surface water containing pesticide residues were analyzed.

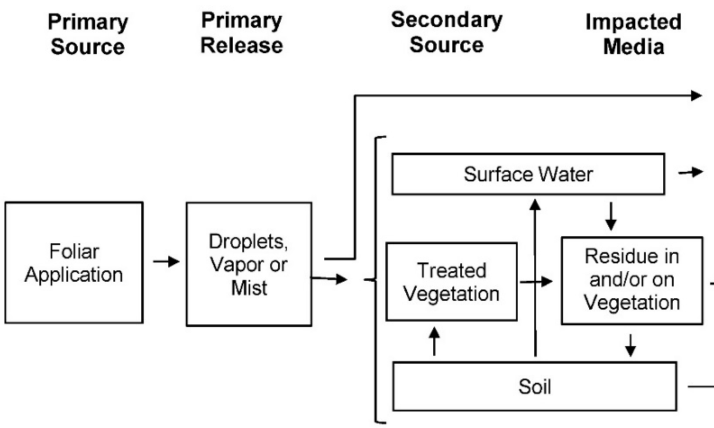
Figure Eco-2 provides details for spray drench applications through turf that can occur in urban/residential settings (PD/EP-E-09, PD/EP-E-10). Incomplete exposure pathways exist for inhalation for ecological receptors since the turf application is made with a large droplet nozzle one to two feet above the ground, greatly reducing the amount of drift. The exposure to terrestrial insects is complete for exposure via ingestion of foliage, pollen or nectar following uptake from treated soil or from deposition following foliar sprays, and toxicity data are available so this pathway has been analyzed. Exposure pathways for terrestrial vertebrates were complete for dermal contact and ingestion of surface water, vegetation, and soil. Adequate exposure and toxicity data exist only for the ingestion pathway for terrestrial vertebrates, so the dermal, although potentially complete, has not been quantitatively evaluated. The exposure pathway for fish and aquatic invertebrates is complete via surface water following movement through or over soil beneath treated plants and from the possibility of limited drift to adjacent surface water, but adequate toxicity data for ingestion of contaminated food items or ingestion of water does not exist, so only effects from exposure from immersion in surface water containing pesticide residues have been quantitatively analyzed.

2.7 Analysis Plan

This ERA uses both reported values in the scientific literature and widely used models specific to ecological risk assessment to estimate the exposures outlined by the CSM. In addition, effects data for the measurement endpoints uses data available from the scientific literature. Since the applications adhering to PD/EP-E-09 or PD/EP-E-10 could occur in various locations in California, many of which would be unlikely to occur on a routine basis, it has not been considered practical to collect and utilize field or site specific data.

The analysis plan with the CSMs has been implemented in the next phase of the ecological risk assessment process, analysis. The analysis phase is broken out into two sections: exposure assessment and effects assessment.

Conceptual Site Model (CSM) for PDEP-Eradication - Residential Foliar Spray
Ecological Risk Assessment



Receptor Groups

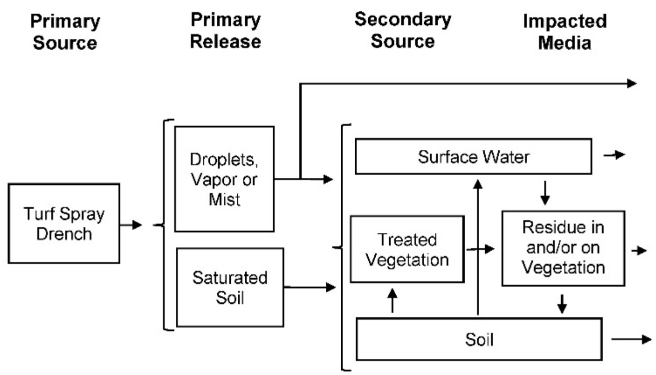
Exposure Routes	Amphibian (terr)	Reptile	Bird	Mammal	Soil Invert	Terr Insect	Amphibian (aq)	Fish	Aq. Invert (1)
Inhalation	‡	‡	‡	‡	o	‡	o	o	o
Dermal	‡	‡	‡	‡	o	x	o	o	o
Ingestion	x	x	x	x	o	‡	‡	‡	‡
Dermal	‡	‡	‡	‡	o	‡	x	x	x
Ingestion	x	x	x	x	o	x	o	o	o
Dermal	‡	‡	‡	‡	o	‡	o	o	o
Ingestion	x	x	x	x	x	‡	o	o	o
Dermal	‡	‡	‡	‡	x	‡	o	o	o

Abbreviations
Soil Invert: Soil Invertebrate
Terr. Insect: Terrestrial Insect
Aq. Invert: Aquatic Invertebrate

Notes:
x - Complete Exposure Pathway
‡ - Although complete, this pathway is not evaluated due to lack of toxicological or exposure data.
o - Incomplete, Inconsequential, or De Minimus Exposure Pathway
(1) Includes sediment-dwelling invertebrates.

Figure Eco-1. Conceptual Site Model for residential foliar applications that may be made as part of CDFA's Pest Detection/Emergency Programs.

Conceptual Site Model (CSM) for PD/EP-Eradication - Residential Turf Drench
Ecological Risk Assessment



Receptor Groups

Impacted Media	Exposure Routes	Amphibian (terr)	Reptile	Bird	Mammal	Soil Invert	Terr Insect	Amphibian (aq)	Fish	Aq. Invert (1)
Droplets, Vapor or Mist	Inhalation	o	o	o	o	o	o	o	o	o
Droplets, Vapor or Mist	Dermal	‡	‡	‡	‡	o	x	o	o	o
Surface Water	Ingestion	x	x	x	x	o	‡	‡	‡	‡
Surface Water	Dermal	‡	‡	‡	‡	o	‡	x	x	x
Residue in and/or on Vegetation	Ingestion	x	x	x	x	o	x	o	o	o
Residue in and/or on Vegetation	Dermal	‡	‡	‡	‡	o	‡	o	o	o
Soil	Ingestion	x	x	x	x	x	‡	o	o	o
Soil	Dermal	‡	‡	‡	‡	x	‡	o	o	o

Abbreviations
Soil Invert: Soil Invertebrate
Terr. Insect: Terrestrial Insect
Aq. Invert: Aquatic Invertebrate

Notes:
x - Complete Exposure Pathway
‡ - Although complete, this pathway is not evaluated due to lack of toxicological or exposure data.
o - Incomplete, Inconsequential, or De Minimus Exposure Pathway
(1) Includes sediment-dwelling invertebrates.

Figure Eco-2. Conceptual Site Model for residential spray drench applications to turf that may be made as part of CDFA's Pest Detection/Emergency Programs.

3 Exposure Assessment

The exposure assessment is part of the analysis phase of the risk assessment process which follows the problem formulation phase described in Section 2. The exposure assessment provides a description and quantification of the nature and magnitude of the interaction between chemicals in surface water, sediment, soil, or groundwater and the ecological receptors. This quantitative accounting of the amount of exposure is known as the Estimated Environmental Concentration (EEC) and is the main outcome of the exposure assessment. The EEC is defined as the predicted concentration of a chemical 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 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 chemicals that an organism is exposed to as the chemical gets 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). Only those pathways or models new or unique to PD/EP-E-09 and PD/EP-E-10 are included below.

Since it is not possible for this ERA to evaluate exact concentrations and exposures in the field, EECs are 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 of the complex fate and transport processes that can occur once the chemicals are released into the environment. Typical fate properties which tend to decrease the concentration of a chemical 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 will represent an upper-bound value since not all fate and transport properties have been modeled.

3.1 Acute and Chronic Exposure

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

3.2 Assumptions for Exposure Following Foliar Applications

Please refer to the Statewide PEIR (CDFA, 2014a) for an explanation of how EECs were estimated following foliar applications. Estimation methods for uptake of residues from soil into plants were updated. Concentrations in surface water were estimated using the USEPA's Surface

Water Concentration Calculator (SWCC) rather than the outdated PRZM-EXAMS Model Shell Version 5.0 (PE5) model. The following section describes how uptake to vegetation was updated and surface water concentrations were estimated.

3.2.1 Concentration in/on Vegetation

Uptake by plants from soil was estimated in a similar manner as in the Ecological Risk Assessment of the PEIR with the exception that a revised Briggs' Equation was used based on the updated version in USEPA (2014a). 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} is negative, the Transpiration Stream Concentration Factor (TSCF) is assumed to be 1.0 (Collins, *et al.* 2006). The values used for soil parameters in the Terrestrial Vegetation Uptake Factor (VUF) equation were those from the Pesticide Root Zone Model (PRZM) for California Residential soil profile for Tierra soils. See the discussion in Section 3.3.4 on the use of the Surface Water Concentration Calculator for the rationale for the selection of this soil type.

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

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

<u>Where:</u>
TSCF = Transpiration Stream Concentration Factor
K_{ow} = Octanol/Water Partition Coefficient (unitless)
ρ = soil bulk density (g-dw/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

Once the terrestrial VUF was estimated, it was multiplied by the pesticide concentration in soil to get the EEC in terrestrial vegetation due to uptake from soil. The EECs estimated and used in this assessment appear in **Appendix Eco-B**.

3.2.1.1 Surface Water Concentrations from Soil Run-off and Aerial Drift

The EECs estimated and used in this assessment appear in **Appendix Eco-A.**

3.3 Assumptions for Exposure Following Turf Application

The exposure estimate procedures and models remained the same as were described in Section 3.2 of the Merit 2F assessment (CDFA, 2016a). A brief discussion is presented here. For full details, please see the Merit 2F assessment.

3.3.1 Soil Concentrations

After application to turf and broad-leafed plants, these areas are 'watered-in' so the pesticide moves into the soil. Some pesticide residue was assumed to remain on the turf or broad-leafed vegetation with the rest washed off into the soil. Based on available literature, 33% of the applied pesticide was assumed to remain on the vegetation and 67% was assumed to wash off to soil (DPR, 2012g; DPR, 2013c). Bare ground areas beneath plants are assumed to have received 100% of the applied chemical. The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

3.3.2 Concentration in/on Vegetation

The only vegetation assumed to receive surface residues following a turf spray drench application would be turf (short grass) and broad-leafed ornamental ground cover. The surface residues were estimated using the USEPA Terrestrial Residue Exposure (T-REX) model. These categories of vegetation retained 33% of the applied chemical after being "watered-in". Uptake from treated soil could occur for all categories of vegetation. Turf and broad-leafed vegetation uptake from the soil was estimated by assuming that 67% of the applied chemical was available for uptake. For seed and fruit uptake, 100% of the applied chemical was assumed to be applied to soil. The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

3.3.3 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 Merit 2F assessment. The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

3.3.4 Surface Water Concentrations of Pesticide Active and Inert Ingredients and Adjuvants

The concentration of active and inert ingredients in surface water resulting from drift, runoff, or erosion during and after pesticide applications was estimated using the Surface Water Concentration Calculator (SWCC) (USEPA, 2014b). SWCC, incorporates two distinct, but connected models to simulate transport from soil to water: the Pesticide Root Zone Model version 5.0+ (PRZM5) and the Variable Volume Water Body Model (VVWM), replacing the older PE5 shell (last updated November 2006), which used PRZM3 and EXAM. 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. SWCC estimates pesticide concentrations in the water as the upper 90th ranked annual peak, 4-day average, 21-day average, 60-day average, 365-day average of the simulation as well as the mean value of all daily concentrations in the simulation. SWCC also estimates the upper 90th ranked annual and 21-day average benthic pore water peak concentrations as well as the annual and 21-day concentration in sediment.

The standard PRZM/VWMM 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 sediment, as predicted by PRZM, are discharged into a standard water body, and simulated by VWMM. VWMM accounts for volatilization, sorption, hydrolysis, biodegradation, and photolysis of the pesticide (USEPA, 2014c).

The PRZM5 standard scenario used, referred to in the model documentation as the "farm pond scenario," is a 10-hectare (24.7-acre) agricultural field, releasing pesticide-containing runoff into a one-hectare (2.47-acre) body of water, 2 meters (6.56 feet) deep equaling 20,000 cubic meters (706,293 cubic feet). This scenario was used for pesticide exposure assessments because it focuses on exposure to ecological receptors (Wild and Jones, 1992). 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. Benthic 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 chemical 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 due to tidal and wave action.

To simulate application efficiency and spray drift loadings to waterbodies resulting from spray drench applications to turf and groundcover, an Application Efficiency (fraction) value of 1 and Spray Drift (fraction) value of 0 have been selected to simulate all of the pesticide reaching the target site (i.e., no application inefficiencies or spray drift loadings to waterbodies). Although described as a drench application, turf applications result in a significant degree of interception by grass foliage. To reflect this, all turf application scenarios were evaluated as foliar applications. Additionally, 33% was assumed remain on grass or foliage following watering-in of pesticide into turf. This approach results in a 3-fold reduction of pesticide on foliage and an equivalent increase of pesticide in soil (DPR, 2013c).

To simulate application efficiency and spray drift loadings to waterbodies resulting from foliar applications, AgDRIFT Version 2.1.1 (USEPA, 2010p) was used. For foliar applications, the Tier I Ground (Agricultural) mode was used and Boom Height (Low Boom) and Droplet Size Distribution (ASAE Fine to Medium/Coarse) were selected. Spray drift fraction was determined by choosing the Aquatic Assessment option and defining the Distance to Water Body from Edge of Application as 0 feet. Based on the previous selections, the estimated application efficiency and spray drift percentages used for foliar applications were 99.6% and 0.9%, respectively. The canopy cover and height were assumed to be 80% and 914 cm (30 ft.), respectively, for foliar applications.

Appendix 2A

PRZM Scenario Files have been selected based on similarities between application location and setting and the environment modeled by the scenario file. The CAresidentialRLF scenario was selected to simulate residential turf applications. Additionally, to account for unintended applications to nearby impervious surfaces, such as pavement, sidewalks, and driveways, DPR recommends that a parallel run of SWCC be performed with CAimperviousRLF and the area-weighted average of the two SWCC-predicted EEC's be reported as the final EEC (Luo, 2014). In estimating the area-weighted average, a weighting of 99.5% and 0.5% were applied to CAresidentialRLF and CAimperviousRLF runs, respectively, to account for the vast majority of applied pesticide reaching the target site with minimal spray to impervious surfaces. The modeled soil parameters were left as the CAresidentialRLF defaults (Tierra soils), which are considered representative of urban residential areas.

The PRZM Scenario File selected for analysis of foliar applications was CAfruit_WirrigSTD. To achieve consistency with the spray drench applications to turf and groundcover analysis, the soil parameters were adjusted to match Tierra soils to represent foliar applications in urban residential areas.

The treatment area covers 640 acres of urban landscape, of which only up to roughly a third may be treated (e.g., lawns, turf, groundcover, etc.). Therefore, the field area to which treatment occurs was defined as one-third of 640 acres, or 861,980 m^2 for both turf and foliar application analyses. The hydraulic length was calculated as the square root of the area of field to provide the depth of a field assumed to be square. The hydraulic length was estimated to be 928 m. Consistent with slopes and soil types found in the National Resource Conservation Service Soil Survey in urban settings, a land slope of 2% was selected (Soil Survey Staff, 2016).

SWCC 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 have been used in preference to the soil/water partition coefficient (K_d). Water bodies modeled through SWCC are fixed at pH 7 (pers. comm. D.F. Young, USEPA), therefore neutral hydrolysis half-lives (pH 7) are used as inputs. A reference temperature of 25°C were selected for each degradation pathway and a value of 40°N was selected for the photolysis reference latitude. Ingredient-specific physical and chemical properties are presented in the Statewide PEIR (CDFA, 2014a).

Chemicals were assumed to be retained on foliage (Left as Foliage), which allows for both foliar degradation and wash off during rain events and subsequent transport to waterbody via runoff and erosion.

SWCC uses weather files containing weather data from 1961 through 1990. The Sacramento meteorological file, Sacramento.dvf, was selected to represent both foliar applications and spray drench applications to turf and groundcover in California. The starting application dates selected for turf and foliar applications were April 15th and May 15th, respectively. For turf applications, only a single application per year was modeled. For foliar applications, 4 applications per year with a 21 day interval between repeat applications were modeled. The EECs estimated and used in this assessment appear in **Appendix Eco-A.**

3.4 Assumptions for Exposure Following Turf Spray Drench or Foliar Applications

Estimation of EECs for many environmental media did not differ for turf spray drench or foliar applications.

3.4.1 Tissue Concentrations in Aquatic Organisms

As described Section 3.3.2 of Appendix A, the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a), tissue concentrations in aquatic organisms were estimated using the USEPA's K_{ow} Aquatic BioAccumulation Model (KABAM) (USEPA, 2009s). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

3.4.2 Terrestrial Exposure Assessment

3.4.2.1 Estimated Environmental Concentrations (EECs)

Except for the changes discussed in Sections 3.2 and 3.3 regarding assumptions updated for foliar applications or specific to a turf spray drench application, the models and assumptions for estimating exposure to terrestrial ecological receptors are the same as described in the Statewide PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

3.4.2.2 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 for each program. 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:

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

For species with a home range or foraging area smaller than the size of the treated plot, all their food was assumed to be gathered from a treated plot. For species with a home range larger than the size of the treated plot, the proportion of diet containing pesticide residues could be assumed to be comparable to the AUF.

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 exposure estimate has been 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 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 mid-point AUF would be 0.725. In the chronic assessment of aquatic species, the AUF was always 1.0. By presenting a range of exposures estimated from different AUF (*i.e.*, no AUF, Mid-Point 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 plots 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 conservative enough. Inclusion of the mid-point AUF was an attempt to capture this uncertainty. Therefore, both ends of this spectrum, as well as the mid-point, were developed and the full range of possibilities presented.

3.4.2.3 Honey Bee and Nontarget Insect Exposure

The USEPA recently released (USEPA, 2014a) guidance for assessing risk of pesticides to honey bees. The methods in the guidance document are essentially the same as those presented in the Statewide PEIR (CDFA, 2014a) based on the proposed methods (USEPA, 2012g).

4 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 inert ingredients 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 5, 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 interest were not available.

In this ERA, the toxicity has been reported as a toxicity reference values (TRVs) that are a numerical representation of the measurement effects that are used in the risk assessment. TRVs are a toxicological index that, when compared with exposure, is used to quantify a risk to ecological receptors. The way in which TRVs are developed depends on available data on 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 chlorantraniliprole can be found in **Appendix Eco-C.**

The USEPA 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 toxicity tests and do not reflect the exposure or dose received by an organism that determines if there is an adverse effect following a pesticide application. This classification only gives a description of the numerical toxicity property of the chemical. It is not until it is combined with a specific dose that adverse effects may occur. The detailed description of the toxicity classification from **Table Eco-1** is provided for each application scenario 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

Taken from USEPA, 2012h

The active ingredient in Acelepryn® is chlorantraniliprole. Chlorantraniliprole is moderately toxic to aquatic-phase amphibians. Chlorantraniliprole ranges from very highly toxic to highly toxic to freshwater and estuarine/marine aquatic invertebrates and is slightly to practically nontoxic to freshwater and estuarine/marine fish.

No toxicity information was available for terrestrial-phase amphibians, so the toxicity of chlorantraniliprole to terrestrial-phase amphibians was assumed to be similar to that in birds. Chlorantraniliprole is practically nontoxic to birds but slightly toxic to mammals. No toxicity data were available for reptiles, so chlorantraniliprole was assumed to show similar toxicity to reptiles as to birds. Chlorantraniliprole is moderately to highly toxic to bees.

5 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 pieces from the analysis phase: exposure and effects assessment. In the risk characterization, exposure and effects data are integrated to allow the risk assessor to draw conclusions concerning the presence, nature, and magnitude of effects that may exist under the application scenarios. This includes both quantitative and qualitative assessments in order 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 Risk Quotient (RQ) – against a target value – the Level of Concern (LOC). For scenarios that have RQs below the LOC, a risk assessor can conclude that there is 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 risk assessor conducts a qualitative analysis of the risk which incorporates information that is not able to be incorporated into the quantitative analysis and makes a qualitative determination of the potential for adverse effects from implementation of the scenario.

Appendix 2A

In ecological risk assessments for pesticides, EECs or Daily Dose determined in the exposure assessment (Section 3) are compared to TRVs developed in the effects assessment (Section 4) to calculate an RQ (USEPA, 2004j).

$$RQ = \frac{\text{EEC or Daily Dose}}{\text{TRV}}$$

Where:
RQ = Risk Quotient (unitless)
EEC = Estimated Environmental Concentration (mg/kg (dw) or µg/L)
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 has been presumed to exist for the non-threatened or non-endangered ecological receptor being assessed. For listed threatened or endangered species, the LOC was 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 was shown to exceed the standard LOC suggesting exposures to all species might be harmful, the T&E LOC providing additional protection to special-status species is necessarily exceeded.

RQs for both acute and chronic risk have been calculated in the same manner using the appropriate acute or chronic EEC or estimated Daily Dose paired with appropriate acute or chronic TRV. When all chemical ingredients including active, inert, adjuvants, or tank spray additives were assessed, the RQs for all chemicals present were assumed to be additive in nature and thus totaled together to determine the Total RQ which was compared to the applicable LOC. The risk analysis focused on whether the total RQs from all ingredients in the pesticide product along with any additives 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 reader is referred to the full rationale presented here.

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

One of the first qualitative assessments to consider is the actual 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, it is relatively unlikely to come into the area and be exposed to chemicals by ingestion. Pollinating species are less likely to be present if there are no flowers present. Some locations are unlikely to have species present, such as the loading dock area of a nursery. Marine/estuarine species would not be present if the application site is not near the coastline.

CDFA's standard practice prior to implementing any pesticide application scenarios 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 the California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service (NMFS), and/or United States Fish and Wildlife Service (USFWS). Examples of these measures include:

- Conduct application at times when species is unlikely to be present.
- Ensure an adequate buffer distance is maintained to minimize the concentrations of chemicals that reach surrounding habitat by drift or run-off.
- Spray pots on impermeable surfaces to prevent leaching chemicals to native soil.

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

5.2 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. Long-term exposures (chronic) are reduced or diluted in such species because a portion of their diets area is likely acquired off the application area. Refer to the discussion of AUFs in Section 3.4.

5.3 Dilution and Degradation of Chemicals

Through time, concentrations of chemicals following pesticides applications generally decrease. The models used in the quantitative risk assessment have limited capabilities to fully incorporate the numerous fate mechanisms which cause the chemicals to dissipate in the environment. Thus, in many instances, the concentrations that would likely occur would be less than the values used in the quantitative risk assessment, and in the case of chronic exposures the concentrations would be considerably lower than estimated. This applies in particular to soil and water concentrations. In addition to overestimation of concentrations due to chemical breakdown, dilution (or reduction in concentration when mixed) will occur when the chemical residues combine with environmental media that is not contaminated. For instance, during a rain event that assists in transporting chemical residue from foliage and soil to a waterbody, additional water that is not contaminated will add to the volume of water in the waterbody itself. This also applies to water concentrations as the chemical continues 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 6.7 of the main body of the Statewide PEIR (CDFA, 2014a). Indirect pathways would likely have lower concentrations than predicted by the quantitative model, therefore the actual risk to organisms would be lower than predicted. Specific BMPs are required for specific applications conducted by CDFA under their National Pollutant Discharge Elimination System (NPDES) permit.

5.4 Risk Analysis for the Pest Detection/Emergency Program's Foliar Applications (PD/EP-E-09)

The risk analysis focused on whether the RQs resulting from foliar applications of Acelepryn® exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ was shown to exceed the standard LOC suggesting exposures to all species might be harmful, the T&E LOC providing additional protection to special-status species is necessarily exceeded. Since no inert ingredients were identified for Acelepryn®, no RQs for individual ingredients are presented.

Considerable detail was included in the analysis of risk for control of beetles. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs were exceeded. Foliar applications of Acelepryn® for eradication of beetles, principally Japanese beetles, would be made primarily to ornamental plants. Deposition onto bare soil beneath plants is possible. Applications would be made up to 4 times per year at 3-week intervals in an urban/residential setting. Acelepryn® is applied to ornamental plants and trees (up to 30 ft. into the canopy), as well as landscaped areas including flowers and containerized plants. Mitigations include; no application within 48 hours of predicted rain, halt to operations when wind exceeds 10 mph, buffer areas of 12 inches or protective tarp placement around food crop plants and/or immovable property items. Residents are provided information & material/ post treatment precautions. Urban residential settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business. Per the PEIR Proposed Program Description (Page 2-29), CDFA will seek technical assistance from CDFW, USFWS, and/or NMFS to ensure that there are no adverse effects on the species as part of CDFA's site specific analysis. If CDFW, USFWS, and/or NMFS advise CDFA to implement suitable buffers or other suitable measures, these would be incorporated as a mitigation measure BIO-CHEM-2 per the PEIR (Page 6.3-2).

In the Pest Detection/Emergency Programs, Acelepryn® (PD/EP-E-09) applied as a foliar treatment in an urban/residential setting up to 4 times at 3 week intervals was not evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-2** presents the acute and chronic RQs associated with scenarios PD/EP-E-09. 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 and standard LOC appear in bold italics.

5.4.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceeded LOCs. No acute or chronic RQs for terrestrial-phase amphibians exceeded LOCs. Therefore, foliar uses of Acelepryn® was not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

5.4.2 Risk to Aquatic Invertebrates

Foliar applications of Acelepryn® did not result in acute RQs that exceeded LOCs for California freshwater shrimp or Shasta crayfish or the marine/estuarine species, mimic tryonia and black abalone. Foliar treatments in urban/residential areas resulted in acute RQs that exceeded the T&E LOC for Tomales isopod and the standard LOC for vernal pool fairy shrimp. Similarly, foliar applications of Acelepryn® did not result in chronic RQs that exceeded LOCs for California freshwater shrimp and Shasta crayfish. However, foliar treatments in urban/residential areas did result in chronic RQs that exceeded the standard LOC for vernal pool fairy shrimp and Tomales isopod and the estuarine/marine species black abalone and mimic tryonia. In locations where aquatic invertebrate species that exceed any LOCs or other special status species they represent may be present, CDFA will consult with CDFW, USFWS and/or NMFS to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures. With implementation of the recommended measures by the agencies, the potential for adverse effects is low.

Implementation of the Program Management Practices presented in Section 2.11 of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of chlorantraniliprole that might move to surface waters. Wherever the nearby surface water is estuarine or marine, there will be tremendous dilution from wave action and the large volume of water present as compared to the size of the surface water body modeled in the SWCC. Additionally, flowing water will represent a considerable dilution as compared the concentrations modeled by the SWCC. Water concentrations in surface water following applications of Acelepryn® are anticipated to be much lower than the modeled concentrations because of model limitations and Program Management Practices in the Statewide PEIR (CDFA, 2014a).

5.4.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, use of Acelepryn® as a foliar treatment was not thought likely to be harmful for fish.

5.4.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, use of Acelepryn® as a foliar treatment was not thought likely to be harmful for reptiles.

5.4.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, use of Acelepryn® as a foliar treatment was not thought likely to be harmful for birds.

5.4.6 Risk to Mammals

No acute or chronic RQs for mammals exceeded LOCs. Therefore, use of Acelepryn® as a foliar treatment was not thought likely to be harmful for mammals.

5.4.7 Risk to Earthworms

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

5.4.8 Risk to Terrestrial Insects

No acute RQs for the insects based on toxicity to honey bees exceeded LOCs. Therefore, use of Acelepryn® as a foliar treatment was not thought likely to be harmful for pollinators and many other insect species.

5.5 Risk Analysis for the Pest Detection/Emergency Program's Turf Spray Drench Applications (PD/EP-E-10)

The risk analysis focused on whether the RQs resulting from turf spray drench applications of Acelepryn® exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ was shown to exceed the standard LOC suggesting exposures to all species might be harmful, the T&E LOC providing additional protection to special-status species is necessarily exceeded. Since no inert ingredients were identified for Acelepryn®, no RQs for individual ingredients are presented.

Considerable detail was included in the analysis of risk for control of beetles. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs were exceeded. Applications of Acelepryn® for eradication of beetles, principally Japanese beetles, would be made primarily to turf, but also to some broad-leaf ground cover, as well as to bare soil beneath some plants. Applications would be made once per year in an urban/residential setting. Ground application of Acelepryn® to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil) is followed by watering in of material through "thatch" per label. Mitigations include; no application within 48 hours of predicted rain, buffer areas maintained around food crop plants per label, residents provided information & material/ post treatment precautions. Residential/urban settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW, USFWS and/or NMFS to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

Appendix 2A

Table Eco-2. Potential risk associated with Application Scenario PD/EP-E-09: Foliar applications of Acelepryn® to ornamental plants and trees/landscaped areas at 0.136 lb. a.i./Acre to 640 acres in a residential/urban setting.

Surrogate Species	Acute RQ	Chronic RQ AUF	Chronic RQ Midpoint AUF	Chronic RQ No AUF
aquatic California tiger salamander	0.004	NA	NA	0.031
aquatic southern torrent salamander	0.004	NA	NA	0.031
aquatic California red-legged frog	0.004	NA	NA	0.031
aquatic foothill yellow-legged frog	0.004	NA	NA	0.031
aquatic arroyo toad	0.004	NA	NA	0.031
aquatic western spadefoot	0.004	NA	NA	0.031
terrestrial California tiger salamander	0.000	0.007	0.007	0.007
terrestrial southern torrent salamander	0.001	0.012	0.012	0.012
terrestrial California red-legged frog	0.000	0.003	0.003	0.003
terrestrial foothill yellow-legged frog	0.000	0.008	0.008	0.008
terrestrial arroyo toad	0.000	0.007	0.007	0.007
terrestrial western spadefoot	0.000	0.008	0.008	0.008
giant garter snake	0.000	0.007	0.007	0.007
Alameda whipsnake	0.000	0.000	0.000	0.000
northern red diamond rattlesnake	0.000	0.000	0.000	0.000
western pond turtle	0.000	0.005	0.005	0.005
desert tortoise	0.000	0.009	0.009	0.009
East Pacific green sea turtle	0.000	0.000	0.000	0.000
western fence lizard	0.001	0.011	0.011	0.011
blunt-nosed leopard lizard	0.001	0.012	0.012	0.012
tidewater goby	0.001	NA	NA	0.012
delta smelt	0.001	NA	NA	0.012
Sacramento splittail	0.001	NA	NA	0.011
arroyo chub	0.001	NA	NA	0.010
coastal cutthroat trout	0.001	NA	NA	0.011
desert pupfish	0.001	NA	NA	0.010
Chinook salmon	0.001	NA	NA	0.011
tricolored blackbird	0.006	0.004	0.068	0.132
mourning dove	0.000	0.005	0.005	0.005
osprey	0.003	0.000	0.043	0.085
California brown pelican	0.004	0.000	0.049	0.097
California condor	0.000	0.000	0.000	0.001
white-tailed kite	0.001	0.002	0.002	0.002
Cooper's hawk	0.001	0.000	0.001	0.002
fulvous whistling-duck	0.000	0.004	0.004	0.004
western yellow-billed cuckoo	0.009	0.190	0.190	0.190
purple martin	0.011	0.253	0.253	0.253
yellow rail	0.007	0.151	0.151	0.151
mule deer	0.003	0.021	0.021	0.021
riparian brush rabbit	0.018	0.125	0.125	0.125
southern sea otter	0.002	0.001	0.001	0.001
southwestern river otter	0.003	0.002	0.002	0.003
American badger	0.001	0.000	0.000	0.000
northwestern San Diego pocket mouse	0.001	0.009	0.009	0.009
big free-tailed bat	0.016	0.000	0.007	0.014
southern grasshopper mouse	0.015	0.013	0.013	0.013
Nelson's antelope squirrel	0.013	0.011	0.011	0.011

Table Eco-2. Continued.

Surrogate Species	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
vernal pool fairy shrimp	**1.814**	NA	NA	**1.465**
Tomales isopod	***0.505***	NA	NA	**4.080**
California freshwater shrimp	0.002	NA	NA	0.090
Shasta crayfish	0.002	NA	NA	0.090
mimic tryonia	0.445	NA	NA	**3.590**
black abalone	0.445	NA	NA	**3.590**
earthworm	0.000	NA	NA	0.005
honey bee-adult (contact)	0.366			
honey bee-adult (oral)	0.167			
Honey bee-larvae				
Blennosperma vernal pool andrenid bee (contact)	0.366			
Blennosperma vernal pool andrenid bee (oral)	0.167			
San Joaquin tiger beetle (contact)	0.366			

In the Pest Detection/Emergency Programs, Acelepryn® (PD/EP-E-10) applied as a turf treatment in an urban/residential setting once annually was not evaluated in the Statewide PEIR (CDFA 2014b). **Table Eco-3** presents the acute and chronic RQs associated with scenarios PD/EP-E-10. 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 and standard LOC appear in bold italics.

5.5.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceeded LOCs. No acute or chronic RQs for terrestrial-phase amphibians exceeded LOCs. Therefore, turf spray drench uses of Acelepryn® was not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

5.5.2 Risk to Aquatic Invertebrates

Turf applications of Acelepryn® did not result in acute or chronic RQs that exceeded LOCs for California freshwater shrimp or Shasta crayfish. Turf spray drench treatments in urban/residential areas resulted in acute and chronic RQs that exceeded the standard LOC for vernal pool fairy shrimp and Tomales isopod and the estuarine/marine species black abalone and mimic tryonia. In locations where aquatic invertebrate species that exceed any LOCs or other special status species they represent may be present, CDFA will consult with CDFW, USFWS and/or NMFS to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures. With implementation of the recommended measures by CDFW, USFWS and/or NMFS, the potential for adverse effects is low.

Implementation of the Program Management Practices presented in Section 2.11 of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of chlorantraniliprole that might move to surface waters. Wherever the nearby surface water is estuarine or marine, there will be tremendous dilution from wave action and the large volume of water present as compared to the size of the surface water body modeled in the SWCC. Additionally, flowing water will represent a considerable dilution as compared the concentrations modeled by the SWCC. Water concentrations in surface water following applications of Acelepryn® are anticipated to be much lower than the modeled concentrations because of model limitations and Program Management Practices in the Statewide PEIR (CDFA, 2014a).

5.5.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for fish.

5.5.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for reptiles.

5.5.5 Risk to Birds

No acute or chronic RQs for birds exceeded LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for birds.

5.5.6 Risk to Mammals

No acute or chronic RQs for mammals exceeded LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for mammals.

5.5.7 Risk to Earthworms

The acute or chronic RQs for earthworms did not exceed any LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for soil-dwelling invertebrates.

5.5.8 Risk to Terrestrial Insects

No acute RQs for the insects based on toxicity to honey bees exceeded LOCs. Therefore, use of Acelepryn® as a turf spray drench treatment was not thought likely to be harmful for pollinators and many other insect species.

5.6 Risk Analysis for the Pest Detection/Emergency Program's Concurrent Foliar and Turf Spray Drench Applications (PD/EP-E-09-10)

The risk analysis focused on whether the RQ resulting from summing the individual RQs from concurrent applications of Acelepryn® as a turf spray drench (PD/EP-E-10) along with foliar applications of Acelepryn® (PD/EP-E-09) would exceed the LOCs. It is important to remember that whenever an RQ was shown to exceed the standard LOC suggesting exposures to all species might be harmful, the T&E LOC providing additional protection to special-status species is necessarily exceeded. Since no inert ingredients were identified for Acelepryn®, no RQs for individual ingredients are presented.

Table Eco-3. Potential risk associated with Application Scenario PD/EP-E-10: Turf spray drench applications of Acelepryn® at 0.273 lb. a.i./Acre to 640 acres in a residential/urban setting.

Surrogate Species	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic California tiger salamander	0.010	NA	NA	0.075
aquatic southern torrent salamander	0.010	NA	NA	0.075
aquatic California red-legged frog	0.010	NA	NA	0.075
aquatic foothill yellow-legged frog	0.010	NA	NA	0.075
aquatic arroyo toad	0.010	NA	NA	0.075
aquatic western spadefoot	0.010	NA	NA	0.075
terrestrial California tiger salamander	0.000	0.002	0.002	0.002
terrestrial southern torrent salamander	0.001	0.034	0.034	0.034
terrestrial California red-legged frog	0.000	0.007	0.007	0.007
terrestrial foothill yellow-legged frog	0.000	0.012	0.012	0.012
terrestrial arroyo toad	0.000	0.002	0.002	0.002
terrestrial western spadefoot	0.000	0.003	0.003	0.003
giant garter snake	0.001	0.018	0.018	0.018
Alameda whipsnake	0.000	0.000	0.000	0.000
northern red diamond rattlesnake	0.000	0.000	0.000	0.000
western pond turtle	0.001	0.014	0.014	0.014
desert tortoise	0.000	0.004	0.004	0.004
East Pacific green sea turtle	0.000	0.000	0.001	0.001
western fence lizard	0.000	0.004	0.004	0.004
blunt-nosed leopard lizard	0.000	0.004	0.004	0.004
tidewater goby	0.004	NA	NA	0.029
delta smelt	0.004	NA	NA	0.029
Sacramento splittail	0.003	NA	NA	0.025
arroyo chub	0.003	NA	NA	0.023
coastal cutthroat trout	0.003	NA	NA	0.025
desert pupfish	0.003	NA	NA	0.023
Chinook salmon	0.003	NA	NA	0.025
tricolored blackbird	0.009	0.008	0.124	0.241
mourning dove	0.000	0.000	0.000	0.000
osprey	0.009	0.001	0.117	0.233
California brown pelican	0.010	0.001	0.134	0.267
California condor	0.000	0.000	0.000	0.000
white-tailed kite	0.000	0.001	0.001	0.001
Cooper's hawk	0.001	0.000	0.001	0.002
fulvous whistling-duck	0.000	0.005	0.005	0.005
western yellow-billed cuckoo	0.004	0.061	0.061	0.061
purple martin	0.016	0.412	0.412	0.412
yellow rail	0.010	0.247	0.247	0.247
mule deer	0.001	0.008	0.008	0.008
riparian brush rabbit	0.009	0.045	0.045	0.045
southern sea otter	0.004	0.004	0.004	0.004
southwestern river otter	0.008	0.004	0.006	0.007
American badger	0.000	0.000	0.000	0.000
northwestern San Diego pocket mouse	0.000	0.002	0.002	0.002
big free-tailed bat	0.007	0.000	0.002	0.004
southern grasshopper mouse	0.006	0.004	0.004	0.004
Nelson's antelope squirrel	0.006	0.004	0.004	0.004

Table Eco-3. Continued.

Surrogate Species	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
vernal pool fairy shrimp	**4.575**	NA	NA	**4.081**
Tomales isopod	**1.274**	NA	NA	**11.362**
California freshwater shrimp	0.005	NA	NA	0.250
Shasta crayfish	0.005	NA	NA	0.250
mimic tryonia	**1.121**	NA	NA	**9.999**
black abalone	**1.121**	NA	NA	**9.999**
earthworm	0.001	NA	NA	0.013
honey bee-adult (contact)	0.000			
honey bee-adult (oral)	0.069			
Honey bee-larvae				
Blennosperma vernal pool andrenid bee (contact)	0.000			
Blennosperma vernal pool andrenid bee (oral)	0.069			
San Joaquin tiger beetle (contact)	0.000			

Details for the foliar applications of Acelepryn® are provided in Section 5.4. Details for Acelepryn® applied as a turf application are the same as described in Section 5.5. As described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA 2014b), CDFA will consult as necessary with CDFW, USFWS, and/or NMFS to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the unlikely event that an area might receive both a foliar and turf spray drench application of Acelepryn®, this assessment considered whether any LOCs were exceeded. **Table Eco-4** presents the acute and chronic RQs associated with scenarios PD/EP-E-09-10. 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 and standard LOC appear in bold italics.

5.6.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceeded LOCs. No acute or chronic RQs for terrestrial-phase amphibians exceeded LOCs. Therefore, concurrent turf spray drench and foliar applications of Acelepryn® were not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

5.6.2 Risk to Aquatic Invertebrates

Concurrent turf spray drench and foliar applications of Acelepryn® did not result in acute or chronic RQs that exceeded LOCs for California freshwater shrimp or Shasta crayfish. However, concurrent turf spray drench and foliar applications of Acelepryn® in urban/residential areas resulted in acute and chronic RQs that exceeded the standard LOC for vernal pool fairy shrimp and Tomales isopod and the estuarine/marine species black abalone and mimic tryonia. In locations where aquatic invertebrate species that exceed any LOCs or other special status species they represent may be present, CDFA will consult with CDFW, USFWS and/or NMFS to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures. With implementation of the recommended measures by the agencies, the potential for adverse effects is low.

Implementation of the Program Management Practices presented in Section 2.11 of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of chlorantraniliprole that might move to surface waters. Wherever the nearby surface water is estuarine or marine, there will be tremendous dilution from wave action and the large volume of water present as compared to the size of the surface water body modeled in the SWCC. Additionally, flowing water will represent a considerable dilution as compared the concentrations modeled by the SWCC. Water concentrations in surface water following applications of Acelepryn® are anticipated to be much lower than the modeled concentrations because of model limitations and Program Management Practices in the PEIR.

5.6.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceeded LOCs. Therefore, concurrent turf and foliar applications of Acelepryn® were not thought likely to be harmful for fish.

5.6.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceeded LOCs. Therefore, concurrent turf and foliar applications of Acelepryn® were not thought likely to be harmful for reptiles.

5.6.5 Risk to Birds

No acute RQs for birds exceeded LOCs. Only the purple martin exhibited chronic RQs that exceeded the T&E LOC. A major dietary resource for purple martins is flying insects that have emerged from aquatic systems. For the exposure to occur as modeled, sufficient residues would need to reach the aquatic system, and those aquatic insects would need to be able to emerge and be available as food. It is unclear whether birds that consume flying insects, such as the purple martin, could be exposed to the extent suggested by the models used. Insects with residues sufficient to be harmful for birds might be unable emerge or to fly, and therefore would be unavailable as food for flying insectivorous birds. Considering the low potential for insects with sufficient residues to actually be available to insectivorous birds, concurrent turf and foliar applications of Acelepryn® were not thought likely to be harmful for birds.

5.6.6 Risk to Mammals

No acute or chronic RQs for mammals exceeded LOCs. Therefore, concurrent turf and foliar applications of Acelepryn® were not thought likely to be harmful for mammals.

5.6.7 Risk to Earthworms

The acute or chronic RQs for earthworms did not exceed any LOCs. Therefore, concurrent turf and foliar applications of Acelepryn® were not thought likely to be harmful for soil-dwelling invertebrates.

Table Eco-4. Potential risk associated with Application Scenario PD/EP-E-09-10: Combined turf spray drench and foliar applications of Acelepryn® at 0.136 & 0.273 lb. a.i./Acre, respectively, to 640 acres in a residential/urban setting.

Surrogate Species	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic California tiger salamander	0.013	NA	NA	0.106
aquatic southern torrent salamander	0.013	NA	NA	0.106
aquatic California red-legged frog	0.013	NA	NA	0.106
aquatic foothill yellow-legged frog	0.013	NA	NA	0.106
aquatic arroyo toad	0.013	NA	NA	0.106
aquatic western spadefoot	0.013	NA	NA	0.106
terrestrial California tiger salamander	0.000	0.009	0.009	0.009
terrestrial southern torrent salamander	0.002	0.046	0.046	0.046
terrestrial California red-legged frog	0.000	0.010	0.010	0.010
terrestrial foothill yellow-legged frog	0.001	0.020	0.020	0.020
terrestrial arroyo toad	0.000	0.010	0.010	0.010
terrestrial western spadefoot	0.001	0.011	0.011	0.011
giant garter snake	0.001	0.025	0.025	0.025
Alameda whipsnake	0.000	0.000	0.000	0.000
northern red diamond rattlesnake	0.000	0.000	0.000	0.000
western pond turtle	0.001	0.019	0.019	0.019
desert tortoise	0.001	0.013	0.013	0.013
East Pacific green sea turtle	0.000	0.000	0.001	0.001
western fence lizard	0.001	0.015	0.015	0.015
blunt-nosed leopard lizard	0.001	0.016	0.016	0.016
tidewater goby	0.005	NA	NA	0.041
delta smelt	0.005	NA	NA	0.041
Sacramento splittail	0.005	NA	NA	0.036
arroyo chub	0.004	NA	NA	0.033
coastal cutthroat trout	0.005	NA	NA	0.036
desert pupfish	0.004	NA	NA	0.033
Chinook salmon	0.005	NA	NA	0.036
tricolored blackbird	0.015	0.012	0.192	0.372
mourning dove	0.000	0.005	0.005	0.005
osprey	0.012	0.001	0.160	0.318
California brown pelican	0.014	0.001	0.182	0.364
California condor	0.000	0.000	0.001	0.001
white-tailed kite	0.001	0.003	0.003	0.003
Cooper's hawk	0.001	0.001	0.002	0.003
fulvous whistling-duck	0.000	0.009	0.009	0.009
western yellow-billed cuckoo	0.013	0.251	0.251	0.251
purple martin	0.027	***0.665***	***0.665***	***0.665***
yellow rail	0.016	0.398	0.398	0.398
mule deer	0.004	0.029	0.029	0.029
riparian brush rabbit	0.027	0.170	0.170	0.170
southern sea otter	0.006	0.005	0.005	0.005
southwestern river otter	0.011	0.006	0.008	0.009
American badger	0.001	0.000	0.000	0.000
northwestern San Diego pocket mouse	0.002	0.011	0.011	0.011
big free-tailed bat	0.023	0.000	0.009	0.019
southern grasshopper mouse	0.021	0.017	0.017	0.017
Nelson's antelope squirrel	0.019	0.015	0.015	0.015

Table Eco-4. Continued.

Surrogate Species	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
vernal pool fairy shrimp	**6.389**	NA	NA	**5.546**
Tomales isopod	**1.779**	NA	NA	**15.442**
California freshwater shrimp	0.007	NA	NA	0.340
Shasta crayfish	0.007	NA	NA	0.340
mimic tryonia	**1.565**	NA	NA	**13.589**
black abalone	**1.565**	NA	NA	**13.589**
earthworm	0.001	NA	NA	0.018
honey bee-adult (contact)	0.366			
honey bee-adult (oral)	0.236			
Honey bee-larvae	0.000			
Blennosperma vernal pool andrenid bee (contact)	0.366			
Blennosperma vernal pool andrenid bee (oral)	0.236			
San Joaquin tiger beetle (contact)	0.366			

5.6.8 Risk to Terrestrial Insects

No acute RQs for the insects based on toxicity to honey bees exceeded LOCs. Therefore, use of Acelepryn® as a turf treatment was not thought likely to be harmful for pollinators and many other insect species.

6 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 different species were 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) was not available. In the development of TRVs {Section 4 of the ERA as part of the Statewide PEIR (CDFA 2014b)}, 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 terrestrial vertebrates is novel and no published references were available for determining appropriate uncertainty factors. Therefore, professional judgment was used in assigning uncertainty factors to the shrew BMF.

6.1 Exposure Assessment Uncertainties

In this ERA, exposure of ecological receptors could not be directly measured. Models were used to estimate exposure following applications of Acelepryn®. 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.

6.1.1 Application Scenarios

Acelepryn® 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.

The application area was defined by an area surrounding a location(s) where the pest occurs. Within that application area, many features would not be treated with pesticides. For example, pavement and buildings would not treated. Treatment will be made primarily to lawns and ornamental plants. Since it was not possible to know how many plants would treated within the residential application areas, it was assumed approximately one-third of the entire area was treated.

6.1.2 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 SWCC model (USEPA, 2014b). SWCC 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 SWCC 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. Where water bodies, such as vernal pools that are smaller and shallower than the modeled waterbody, were the appropriate habitat for species or provide drinking water for terrestrial species, the estimates from SWCC would be low. However, where water bodies were larger, the estimates were likely extremely exaggerated. SWCC did not allow for estimated water concentrations in a flowing water body. Any water movement would lead to an overestimation of water concentrations by SWCC.

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 range of 4 to 8 were 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 chemical outside the range of Log K_{ow} of 4 to 8. It was not known whether use of KABAM on chemicals with Log K_{ow} outside the ideal range would produce under or overestimates of tissue concentrations.

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 was unlikely that dead prey would be consumed, failure to eliminate dead prey would have produced an overestimation of exposure.

6.1.3 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. SWCC 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.

6.1.4 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, every 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 or terrestrial invertebrates were based primarily on the K_{ow} of the chemical and assumed to be instantaneous. In reality, uptake from an environmental media such as soil or water would require time making any acute EECs selected shortly after an application an overestimation of what was actually present within the plant 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 chemicals 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. The one thing that can be known for sure is that the uptake will not be instantaneous.

Concentrations of chemicals 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 immediately following an application as the chemicals may not have had a chance to migrate through the full 15 cm. Since many chemicals are known to penetrate deeper than 15 cm (*e.g.*, Ramanand *et al*., 1988; Zhang *et al*., 1984), limiting the penetration zone to only 15 cm lead to an overestimation of chronic exposures.

Tissue concentrations in terrestrial vertebrate prey were assumed to be equivalent to the daily intake of a chemical. These residues would initially 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 chemical 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 in 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 ecological receptors 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 Mid-point 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.

6.1.5 Exposure of Birds and Mammals to Aquatic Prey

Species such as the osprey or southwestern river otter that typically forage in freshwater habitats larger than the waterbody modeled in SWCC or the California brown pelican or southern sea otter that forage in marine/estuarine environments are likely to be exposed to prey from waters with lower concentrations than estimated by SWCC. The degree to which exposure for these species was overestimated is unknown.

6.2 Effects Assessment Uncertainties

6.2.1 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 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 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.

6.2.2 Sublethal Effects

Sublethal effects were not specifically addressed, but when ecologically relevant sublethal toxicity endpoints were available for on which to base TRVs, those results were preferentially selected.

6.2.3 Dermal or Inhalation Effects

In ERAs, it is standard practice to only address effects from oral exposure to terrestrial vertebrates. In general, focusing on effects from oral exposures in 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, particularly fumigants, 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 Conclusions

This ERA was conducted to determine the potential harm to ecological receptors from implementation of turf spray drench and/or foliar treatments for eradication of Japanese Beetles. 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 up on the three stage process for risk assessments: problem formulation, analysis, and risk characterization.

Appendix 2A

In the problem formulation phase, 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 representations based on scientific literature. 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 pathway. 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 toxicity properties of the chemicals along with safety factors used 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 5 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 resulted in a conclusion that the potential for adverse effects would be low. As described in Section 5, this includes an assessment of the potential for species presence at an actual site, incorporation of foraging range and diet, 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 insectivorous birds 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 turf and low-growing groundcover, only those insects dwelling on those plant types would be directly exposed. Most insects, such as flying insects, would receive very limited exposure during a turf spray drench application. Thus, most insects and insectivorous species are anticipated to be exposed to a limited extent during a turf spray drench application and impacts would be minimal. With the exception of some aquatic receptors, exposure and the potential for impacts would not be greater following a foliar application.

This ERA along with the Statewide PEIR (CDFA, 2014a) will be used to assist CDFA in assessing the potential to affect 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. No alterations to PD/EP-E-09 PD/EP-E-10 that were not already indicated for other scenarios in the PEIR are recommended for the protection of biological resources.

8 References

NOTE: References match those listed in the Dashboard Database. Therefore, lettering order following publication years may not always be in sequence in this report. Links to webpages and PDFs were active as of the listed access date. Access to those web resources and information presented therein are subject to change.

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Appendix 2A

Appendix Eco-A. Estimated water concentrations using the Surface Water Concentration Calculator.

Estimated water concentrations of chlorantraniliprole following Application Scenarios PD/EP-E-09 (foliar) and PD/EP-E-10 (turf spray drench) of Acelepryn® at 0.136 & 0.273 lb. a.i./Acre, respectively, to 640 acres in a residential/urban setting.

Chemical	Inst. Limnetic C_w (µg/L)	Inst. Benthic C_w (µg/L)	21 Day Limnetic C_w (µg/L)	21 Day Benthic C_w (µg/L)	31 Day Limnetic C_w (µg/L)	31 Day Benthic C_w (µg/L)	60 Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
PD/EP-E-09	0.89	0.66	0.72	0.68	0.72	0.68	0.74	25
PD/EP-E-10	2.24	1.17	2.00	1.16	2.00	1.16	1.75	25

Appendix Eco-B. Estimated Environmental Concentrations.

Estimated Environmental Concentrations following Application Scenarios PD/EP-E-09 (foliar) and PD/EP-E-10 (turf spray drench) of Acelepryn® at 0.136 & 0.273 lb. a.i./Acre, respectively, to 640 acres in a residential/urban setting.

EcoRisk Model Run	**Baseline- No Drift Buffer to Water or Habitat**			
Chemical	**Chlorantraniliprole**			
Application Scenario	**PD/EP-E-09**		**PD/EP-E-10**	
Acute or Chronic	**Acute EECs (maximum instantaneous)**	**Chronic EECs (TWA)**	**Acute EECs (maximum instantaneous)**	**Chronic EECs (TWA)**
Bee (Contact) (mg/bee)	5.86E-04	-	0.00E+00	-
Pollen & Nectar (mg/bee)	6.94E-03	4.83E-03	2.88E-03	1.52E-03
Pollen & Nectar Larval (mg/bee)	2.96E-03	2.06E-03	1.24E-03	6.46E-04
Terrestrial Insects (mg dw/kg)	1.36E+02	9.47E+01	5.65E+01	2.97E+01
Terrestrial Invertebrates (mg /kg (dw))	4.68E+00	4.60E+00	1.22E+01	1.20E+01
Aquatic Invertebrates (mg /kg (dw))	7.04E+01	5.75E+01	1.76E+02	1.57E+02
Aquatic Insects (mg /kg (dw))	1.69E+02	1.38E+02	4.21E+02	3.76E+02
Aquatic Vegetation (mg /kg (dw))	1.88E-02	1.95E-02	3.36E-02	3.34E-02
Mixed Terrestrial Vegetation (mg /kg (dw))	2.34E+02	1.63E+02	1.13E+02	5.92E+01
Terrestrial Broad-Leafed Vegetation (mg /kg (dw))	1.95E+02	1.36E+02	8.11E+01	4.26E+01
Terrestrial Grass (mg /kg (dw))	3.16E+02	2.20E+02	1.80E+02	9.47E+01
Seeds (mg /kg (dw))	3.59E+00	2.50E+00	9.81E-04	9.64E-04
Fruit (mg /kg (dw))	1.41E+01	9.85E+00	3.87E-03	3.80E-03
Mammals (mg /kg (dw))	1.03E+01	1.42E+00	4.63E+00	4.81E-01
Birds (mg /kg (dw))	1.08E+01	7.57E-01	1.60E+01	1.17E+00
Reptiles (mg /kg (dw))	9.13E-01	2.39E+00	8.50E-01	2.19E+00
Amphibians (mg /kg (dw))	8.67E-01	4.29E+00	9.75E-01	4.51E+00
Fish (mg /kg (dw))	1.13E+02	9.19E+01	2.83E+02	2.53E+02
Acute Soils (mg /kg (dw))	5.22E-02	-	1.36E-01	-
31-Day Soil TWA (mg /kg (dw))	-	5.13E-02	-	1.34E-01
56-Day Soil TWA (mg /kg (dw))	-	5.05E-02	-	1.32E-01

Notes:
"-" – Indicates that an EEC is not applicable to the media

Appendix 2A

Appendix Eco-C. Toxicity Reference Values

Toxicity Reference Values for chlorantraniliprole.

Species	Acute/ Chronic	TRV		Reference	Notes
Arroyo Toad_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Arroyo Toad_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
California Tiger Salamander_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
California Tiger Salamander_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Western Spadefoot_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Western Spadefoot_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Arroyo Toad_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Arroyo Toad_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Foothill Yellow-legged Frog_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Foothill Yellow-legged Frog_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
California Red-legged Frog_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
California Red-legged Frog_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Southern Torrent Salamander_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Southern Torrent Salamander_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Western Spadefoot_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Western Spadefoot_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)

Appendix 2A

Species	Acute/ Chronic	TRV		Reference	Notes
Foothill Yellow-legged Frog_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Foothill Yellow-legged Frog_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
California Red-legged Frog_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
California Red-legged Frog_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Southern Torrent Salamander_AQ	Acute	234	µg/L	Wei et al., 2014	TRV based on 1/20th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
Southern Torrent Salamander_AQ	Chronic	23.4	µg/L	Wei et al., 2014	TRV based on 1/200th the LC50 for the Chinese tiger frog tadpoles (*Hoplobatrachus chinensis*)
California Tiger Salamander_TE	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
California Tiger Salamander_TE	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Tomales Isopod	Acute	1.76	µg/L	USEPA, 2008h	TRV based on 1/20th the LC50 for the scud (*Gammarus pseudolimnaeus*)
Tomales Isopod	Chronic	0.176	µg/L	USEPA, 2008h	TRV based on 1/200th the LC50 for the scud (*Gammarus pseudolimnaeus*)
Vernal Pool Fairy Shrimp	Acute	0.49	µg/L	USEPA, 2008h	TRV based on 1/20th the EC50 in water flea
Vernal Pool Fairy Shrimp	Chronic	0.49	µg/L	USEPA, 2008h	TRV based on 1/20th the EC50 in water flea (The NOAEC for chronic toxicity was reported as 4.47 µg/L, so used acute TRV because it was lower than the chronic NOAEC)
California Freshwater Shrimp	Acute	480	µg/L	Barbee et al., 2010	TRV based on the NOAEC for acute effects in the red crayfish
California Freshwater Shrimp	Chronic	8	µg/L	Barbee et al., 2010	TRV based on 1/60th the NOAEC for acute effects in the red crayfish
Shasta Crayfish	Acute	480	µg/L	Barbee et al., 2010	TRV based on the NOAEC for acute effects in the red crayfish
Shasta Crayfish	Chronic	8	µg/L	Barbee et al., 2010	TRV based on 1/60th the NOAEC for acute effects in the red crayfish
Mimic Tryonia	Acute	2	µg/L	USEPA, 2008h	TRV based on 1/20th the EC50 in the eastern oyster

Appendix 2A

Species	Acute/ Chronic	TRV		Reference	Notes
Mimic Tryonia	Chronic	0.2	µg/L	USEPA, 2008h	TRV based on 1/200th the EC50 in the eastern oyster
Black Abalone	Acute	2	µg/L	USEPA, 2008h	TRV based on 1/20th the EC50 in the eastern oyster
Black Abalone	Chronic	0.2	µg/L	USEPA, 2008h	TRV based on 1/200th the EC50 in the eastern oyster
Osprey	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Osprey	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
White-tailed Kite	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
White-tailed Kite	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Mourning Dove	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Mourning Dove	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
California Brown Pelican	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
California Brown Pelican	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
California Condor	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
California Condor	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Fulvous Whistling-duck	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Fulvous Whistling-duck	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Western Yellow-billed Cuckoo	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Western Yellow-billed Cuckoo	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Purple Martin	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite

Appendix 2A

Species	Acute/ Chronic	TRV		Reference	Notes
Purple Martin	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Tricolored Blackbird /red-winged blackbird	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Tricolored Blackbird /red-winged blackbird	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Yellow rail	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Yellow rail	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Cooper's Hawk	Acute	2250	mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Cooper's Hawk	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Arroyo Chub	Acute	755	µg/l(bw)-day	USEPA, 2008h	TRV based on 1/20 the LC50 for the bluegill sunfish
Arroyo Chub	Chronic	75.5	µg/l(bw)-day	USEPA, 2008h	TRV based on 1/200 the LC50 for the bluegill sunfish
Tidewater Goby	Acute	600	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the sheepshead minnow
Tidewater Goby	Chronic	60	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the sheepshead minnow
Sacramento splittail	Acute	690	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the rainbow trout
Sacramento splittail	Chronic	69	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the rainbow trout
Coastal Cutthroat Trout	Acute	690	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the rainbow trout
Coastal Cutthroat Trout	Chronic	69	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the rainbow trout
Desert Pupfish	Acute	755	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the bluegill sunfish
Desert Pupfish	Chronic	75.5	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the bluegill sunfish
Chinook Salmon--Central Valley spring-run ESU	Acute	690	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the rainbow trout

Appendix 2A

Species	Acute/ Chronic	TRV		Reference	Notes
Chinook Salmon--Central Valley spring-run ESU	Chronic	69	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the rainbow trout
Delta smelt	Acute	600	µg/L	USEPA, 2008h	TRV based on 1/20 the LC50 for the sheepshead minnow
Delta smelt	Chronic	60	µg/L	USEPA, 2008h	TRV based on 1/200 the LC50 for the sheepshead minnow
Riparian brush rabbit	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Riparian brush rabbit	Chronic	100	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/10th the subchronic NOAEL for developmental rabbit study
Southern (Ramona) Grasshopper Mouse	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	805	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in chronic rat toxicity study
Big Free-tailed Bat	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Big Free-tailed Bat	Chronic	805	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in chronic rat toxicity study
Mule Deer	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Mule Deer	Chronic	100	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/10th the subchronic NOAEL for developmental rabbit study
Northwestern San Diego Pocket Mouse	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Chronic	113.5	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/10th the NOAEL in the 90-day mouse feeding study
Nelson's Antelope Squirrel	Acute	1000	mg/kg(bw)-day	USEPA, 2008f	TRV based on 1/5th the LD50 in the rat
Nelson's Antelope Squirrel	Chronic	805	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in chronic rat toxicity study
American Badger	Acute	1164	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 90-day dog feeding study
American Badger	Chronic	1163	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 1-year dog feeding study
Southwestern River Otter	Acute	1164	mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 90-day dog feeding study

Appendix 2A

Species	Acute/ Chronic	TRV	Reference	Notes
Southwestern River Otter	Chronic	1163 mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 1-year dog feeding study
southern sea otter	Acute	1164 mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 90-day dog feeding study
southern sea otter	Chronic	1163 mg/kg(bw)-day	USEPA, 2008f	TRV is based on NOAEL in the 1-year dog feeding study
East Pacific Green Sea Turtle	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
East Pacific Green Sea Turtle	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Giant Garter Snake	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Giant Garter Snake	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Alameda Whipsnake	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Alameda Whipsnake	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Northern red-diamond rattlesnake	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Northern red-diamond rattlesnake	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Desert Tortoise	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Desert Tortoise	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Western Fence Lizard	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Western Fence Lizard	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Blunt-nosed Leopard Lizard	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite
Blunt-nosed Leopard Lizard	Chronic	75 mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
Western Pond Turtle	Acute	2250 mg/kg(bw)-day	USEPA, 2008h	TRV based on the NOAEL for acute toxicity in northern bobwhite

Appendix 2A

Species	Acute/ Chronic	TRV		Reference	Notes
Western Pond Turtle	Chronic	75	mg/kg(bw)-day	USEPA, 2008h	TRV based on 1/30th the NOAEL for acute toxicity in northern bobwhite
San Joaquin tiger beetle	Acute	1.6	g a.i./ha	EFSA, 2013	TRV based on 40% of the contact LD50 in the honey bee
San Joaquin tiger beetle	Acute	41.6	µg/org	EFSA, 2013	TRV based on 40% of the oral LD50 in the honey bee
Earthworm	Acute	200	mg/kg soil	USEPA, 2008h	TRV is based on 1/5th the LC50 in the earthworm
Earthworm	Chronic	10	mg/kg soil	USEPA, 2008h	TRV is based on 1/100th the LC50 in the earthworm
Honey Bee (adult)-Contact	Acute	1.6	µg/bee	EFSA, 2013	TRV based on 40% of the contact LD50 in the honey bee
Honey Bee (adult)-Oral	Acute	41.6	µg/bee	EFSA, 2013	TRV based on 40% of the oral LD50 in the honey bee
Honey Bee (adult)-Oral	Chronic		µg/bee		No toxicity data available on which to base a TRV
Blennosperma vernal pool andrenid bee	Acute	1.6	g a.i./ha	EFSA, 2013	TRV based on 40% of the contact LD50 in the honey bee
Blennosperma vernal pool andrenid bee	Acute	41.6	µg/org	EFSA, 2013	TRV based on 40% of the oral LD50 in the honey bee
Honey Bee (larvae)-Contact	Acute				No toxicity data available on which to base a TRV
Honey Bee (larvae)-oral	Acute				No toxicity data available on which to base a TRV
Honey Bee (larvae)-oral	Chronic				No toxicity data available on which to base a TRV

Appendix 2A

Appendix Eco-D. Program Material Data Sheets (PMDS).

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

PMDS Status Summary

Prepared by
(CDFA):**L. Petro** Date: **3.3.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **3.16.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): **L. Petro** Date: **4.8.16**

☒ Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **4/22/16**

☐Reviewed, ☐ Revised, ☒ Approved by:
(CDFA): **L.Petro** Date:5/3/16

☐Reviewed, ☐ Revised, ☒ Approved by:
(Blankinship):J. Sullivan Date: 5/4/16

INSTRUCTIONS:

1.) Fill in the PMDS template with the specific application scenario details.
2.) In the "Application Description" section, please provide a description of 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.) If the scenario involves fumigation, trapping, varying application intervals, or if multiple active ingredients are used, please contact Blankinship & Associates at (530) 757-0941.
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

Program Name: PD/EP-E-09

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
Acelepryn	No	Chlorantraniliprole	Beetle	Ornamental plants, shrubs and trees

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	Urban residential landscapes* See "*" definition below	Statewide

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.)
Turf, soil, organic or inorganic mulch	Foliar spray	Mechanically pressurized sprayer, Backpack or hand pump sprayer

Applications per year	Application Interval	Application Rate	Application Rate Units	Final Tank Mix Applied	Tank Spray Volume per Area Unit
Up to 4	3 weeks	8	Oz/100 gal	3	gal/1000 SF

Application Area	Application Area Units	Area Treated/Day	Area Treated/Day Units
640	acres	1.5	acres

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Application Description & Assumptions (please describe the application in as much detail as possible. Use the 2nd page if needed):

In a 200 meter radius around detections, foliar application of Acelepryn to foliage of ornamental plants and trees/landscaped areas including flowers and containerized plants. No application to edible plants, including fruit or nut trees. Application height to a maximum of 30' into tree canopy. Mitigations include; no application within 48 hrs. of predicted rain, halt to operations when wind exceeds 10 mph, buffer areas of 12 inches or protective tarp placement around food crop plants and/or immovable property items. Residents provided information & material/ post treatment precautions. Applications made under supervision of CDFA and CAC PUE. Urban residential settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business.

Follow all label requirements. Program staff will conduct a Site Assessment to verify each program area to determine if there are any specific conditions that need further evaluation.

CDFA PMDS (Add additional detail as needed below to fully describe the proposed activity):

Add text here.

- Application could be made as early as mid-May through August.
- Staff wearing PPE identical to the applicators will hold up a barrier to act as a shield to prevent drift to nontarget areas.
- Protective tarp placement around food crop plants and or immovable objects in yards.
- Treated landscape signs will be posted with a minimum of four hour re-entry period for landscape.
- Recommend no food crops be planted in areas treated with Acelepryn for one year.

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

PMDS Status Summary

Prepared by
(CDFA):**L. Petro** Date: **3.3.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **3.11.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): **L. Petro** Date: **3.22.16**

☒ Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **4/22/16**

☒Reviewed, ☐ Revised, ☒ Approved by:
(CDFA):______L. Petro___Date: 5.3.16_____

☐Reviewed, ☐ Revised, ☒ Approved by:
(Blankinship):J. Sullivan Date: 5/4/16

INSTRUCTIONS:

1.) Fill in the PMDS template with the specific application scenario details.
2.) In the "Application Description" section, please provide a description of 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.) If the scenario involves fumigation, trapping, varying application intervals, or if multiple active ingredients are used, please contact Blankinship & Associates at (530) 757-0941.
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

Program Name: PD/EP-E-10

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
Acelepryn	No	Chlorantraniliprole	Beetle	Ornamental/turf/ground cover

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	Urban/residential on turf/ground* cover landscapes. See "*" definition below	Statewide

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.)
None	Spray drench	Mechanically pressurized sprayer, boom sprayer, hand pump sprayers, backpack sprayers

Applications per year	Application Interval	Application Rate	Application Rate Units	Final Tank Mix Applied	Tank Spray Volume per Area Unit
1	Annual	16	Oz/100 gal	3	gal/1000 SF

Application Area	Application Area Units	Area Treated/Day	Area Treated/Day Units
640	acres	20,000 (18)	sq. Ft with backpack (acres with boom) see attached

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Application Description & Assumptions (please describe the application in as much detail as possible. Use the 2nd page if needed):

In a 200 meter radius around detections, *ground application of Acelepryn to turf (includes lawns/golf courses), recreational areas, ornamental plants (includes flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil/followed by "watering in" of material through "thatch" per label. Mitigations include; no application within 48 hrs. of predicted rain, buffer areas of 12 inches maintained around food crop plants. Residents provided information & material/ post treatment precautions. Applications made under supervision of CDFA and CAC PUE. Urban residential settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. Mechanically pressurized sprayer, backpack sprayer or hand pump application except sports fields or other large areas may be treated using a boom sprayer. Watering is done using similar ground spray equipment.

Follow all label requirements. Program staff will conduct a Site Assessment to verify each program area to determine if there are any specific conditions that need further evaluation.

CDFA PMDS (Add additional detail as needed below to fully describe the proposed activity):

Add text here.

- Application timing as early as mid-April through mid-May.
- Following the pesticide application, the watering in will be done at a minimum of two gallons per 1,000 square feet.
- Application areas will be 20,000 sq. ft. with a backpack sprayer made by an individual applicator; 18 acres with a boom sprayer with a single applicator.
- Staff wearing PPE identical to the applicators will hold up a barrier to act as a shield to prevent drift onto nontarget areas with residues on the barrier washed onto lawn.
- Treated landscape signs will be posted with a four hour re-entry period for landscape. Landscapes will be inspected to make sure it is dry prior to removal of signs.

Tab 2:

Human Health Risk Assessment (81 pages)

Appendix 2A

California Department of Food and Agriculture
Statewide Plant Pest Prevention and Management Program

Human Health Risk Assessment

Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program

Prepared for:

California Department of Food and Agriculture
1220 N Street
Sacramento, CA 95814

Contact:
Laura Petro
(916) 654-0317

Prepared by:

Blankinship & Associates, Inc.
1590 Drew Ave, Suite 120
Davis, CA 95618

Contact:
Mike Blankinship
530-757-0941

March 10, 2017

Appendix 2A

TABLE OF CONTENTS

Appendix 2A

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

A .... Applicator

AADD .... Annual Average Daily Dose

ADD .... Average Daily Dose

Appendix 2A

AF ....Soil Adherence Factor
AR..Application Rate
AT ....Averaging Time
ATSDR ....Agency for Toxic Substances Disease Registry
BMP ....Best Management Practices
BW ....Body Weight
CDFA ....California Department of Food and Agriculture
CDPH...California Department of Public Health
DPR..California Department of Pesticide Regulation
CEDEN ....California Environmental Data Exchange Network
CF..Conversion Factor
CIF ....Canopy-Interception Factor
CR ....Contact Rate
CSF ....Cancer Slope Factor
CSM ....Conceptual Site Model
DAF..Dermal Absorption Factor
DFR..Dislodgeable Foliar Residue
DWB ....Downwind Bystander
DtO...Drift to Object
DtT ....Drift to Turf
ED ....Exposure Duration
EEC ....Estimated Environmental Concentration
EF...Exposure Frequency
EFH ....USEPA's Exposure Factors Handbook: 2011 Edition (USEPA, 2011p)
EGVM..European Grapevine Moth
ERA..Ecological Risk Assessment Report for Acelepryn® Residential Foliar and Turf, Japanese Beetle Eradication Program
ET...Exposure Time
F_{AR} ....Fraction of Transferable a.i.
Fai_{Hands} ....Fraction of Total Residue on Hands
FD ....Fraction of Residue that Dissipates per Day

Appendix 2A

FI ....Fraction Ingested

F_{oc} ....Fraction of Organic Carbon

HHRA ....Human Health Risk Assessment

HSDB...Hazardous Substances Data Bank

ILS...Index Lifestage

IRIS ....Integrated Risk Information System

IRs...Soil Ingestion Rate

IR_V ....Vegetation Ingestion Rate

K_{oc}..Organic Carbon Absorption Coefficient

K_{ow} ....Octanol-Water Partition Coefficient

MOE..Margin of Exposure

MLA...Mixer-Loader-Applicator

N/A...Not Applicable

NYSDEC...New York State Department of Environmental Conservation

NO(A)EL/ NOAEL.......................................No Observable (Adverse) Effect Level

OEHHA..Office of Environmental Health Hazard Assessment

OPHED ....Occupational Pesticide Handler Exposure Data

OR_t...Residue Available on Object

PAR..Post-Application Resident

PD/EP-E..Pest Detection/Emergency Projects - Eradication

PE5...PRZM-EXAMS Model Shell Version 5.0

PEIR...Programmatic Environmental Impact Report

PRZM...Pesticide Root Zone Model

RAGS...Risk Assessment Guidance to Superfunds

RED..Reregistration Eligibility Decision

REI ....Restricted Entry Interval

SIDS...Screening Information Dataset System

Statewide PEIR ....California Department of Food and Agriculture (CDFA). 2014a. Statewide Plant Pest Prevention and Management Program Environmental Impact SCH # 2011062057 (Statewide PEIR)

Tc ....Transfer Coefficient

TDE..Turf Dermal Exposure

Appendix 2A

T-REX..Terrestrial Residue Exposure
TSCF..Transpiration Stream Concentration Factor
TTR_t..Transferable Turf Residue
UE ....Unit Exposure
UNEP ....United Nations Environmental Programme
USDA..United States Department of Agriculture
USEPA..U.S. Environmental Protection Agency
VDE ....Vegetative Dermal Exposure
VUF...Vegetation Uptake Factor
WRF..Watering-in Reduction Factor
ρ..Soil Bulk Density
θ..Soil-Water Content by Volume

1 Executive Summary

This Human Health Risk Assessment (HHRA) is conducted as a supplement to the HHRA conducted as part of the Statewide Plant Pest Prevention and Management Program Environmental Impact Report (CDFA, 2014a). Residential application of Acelepryn® (active ingredient: chlorantraniliprole) for foliar and turf spray drench application for the eradication of Japanese beetle was assessed. The methods used in this risk assessment largely follow those methods used in the previous risk assessment in the Statewide PEIR (CDFA, 2014a). Where methods differ, the new assumptions or receptors are discussed.

The application of Acelepryn® could occur in residential/urban settings within a 200 meter radius around beetle detections and includes ground application to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil). Residential/urban settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. A mechanically pressurized sprayer, backpack sprayer or hand pump is typically used in residential settings; sports fields or other large areas may be treated using a boom sprayer. Spray equipment can be adjusted for low pressure applications close to the ground to reduce or eliminate spray drift. Applications are followed by "watering in" of Acelepryn® through "thatch" and into the soil immediately following a turf spray drench application using similar spray equipment. No adjuvants were included in the application scenario analysis.

Acute, subchronic, and chronic dermal, inhalation, and ingestion exposures were considered for residents present during and after the Acelepryn® application, and the following age groups were included: 0-<2 year-old, 2-<16 year-old and 16-70 year-old. Other receptors considered were the resident downwind of the Acelepryn® application and personnel responsible for the handling and application of Acelepryn®. The HHRA did not include cancer effects because chlorantraniliprole is not a known carcinogen. Environmental media considered to contain chlorantraniliprole included inedible vegetation, edible vegetation, turf, soil and air.

Risk was quantitatively assessed using the Margin of Exposure (MOE) technique. For this HHRA, the target MOE value that indicates an unlikely adverse impact to human health is 300. MOE values less than 300 indicate the potential for adverse impacts to health; MOE values greater than 300 indicate that adverse health impacts are unlikely. MOE values calculated for this HHRA ranged from approximately 4,800 to greater than 1.2E+13. This indicates that exposure to Acelepryn® during the Proposed Program is unlikely to result in adverse impacts to human health.

The magnitude of an MOE is indicative of the general safety of exposure, with larger MOEs generally indicating smaller potential health risk. Comparatively large MOEs should not, however, be interpreted as encouraging a receptor to unnecessarily come into contact with environmental media containing chlorantraniliprole.

2 Introduction

This Human Health Risk Assessment (HHRA) evaluates pesticide application scenarios within the California Department of Food and Agriculture's (CDFA) Pest Detection/Emergency Program (PD/EP) for the eradication of Japanese beetle in an urban setting, herein referred to as the "Proposed Program". This document is a supplement to the CDFA Statewide Plant Pest Prevention and Management Program Environmental Impact Report SCH # 2011062057 (Statewide PEIR) (CDFA, 2014a).

2.1 Purpose of the Human Health Risk Assessment (HHRA)

The purpose of this HHRA is to estimate the human health risk from pesticides used under the Proposed Program. The pesticide assessed in this HHRA is Acelepryn®. The known and active ingredient in Acelepryn® is chlorantraniliprole.

This HHRA evaluates risk in the context of the specific application scenarios which may occur under the Proposed Program, taking into account Acelepryn® label language and other relevant regulatory requirements.

2.2 Approach

A detailed discussion of the approach for the HHRA process is provided in the Statewide PEIR, Volume 3, Appendix B, Human Health Risk Assessment (CDFA, 2014a).

This HHRA 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 HHRA depends on these USEPA exposure models to estimate chemical environmental concentrations and risk estimates. The majority of these models, described in detail in the applicable sections of the Statewide PEIR (CDFA, 2014a), 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 is not available. Since multiple models were required for this HHRA and some models require the output of previous models as its 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 Acelepryn® application scenario. This Excel workbook, developed by Blankinship & Associates under contract with CDFA, is referred to as the Comprehensive Risk ANalysis Kalculator (CRANK), providing a consolidated tool to estimate risk for the HHRA as well as the Ecological Risk Assessment (ERA).

Staff from the Department of Pesticide Regulation (DPR), California Department of Public Health (CDPH), and Office of Environmental Health Hazard Assessment (OEHHA) reviewed and commented on all phases of the Proposed Program's HHRA. The purpose of this involvement was to facilitate the exchange of information and collaborate on methods to assess and protect human health and the environment and clearly communicate these methods and results to the public.

3 Hazard Identification

The first step in conducting the HHRA is a planning process called Hazard Identification (OEHHA, 2001a). This included identification of the ingredients of Acelepryn® and the use scenarios that are anticipated under the Proposed Program. Acelepryn® ingredients were determined from pesticide manufacturers' label and safety data sheet (SDS). Details regarding the application of chemicals 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., agriculture, residential)

The primary objectives of the Pest Detection/Emergency Program (PD/EP) are the early detection and prompt eradication of serious agricultural pests from California including, but not limited to, Japanese beetle, exotic fruit flies, light brown apple moth, khapra beetle, gypsy moth, European corn borer, and European pine shoot moth. Eradication activities conducted under PD/EP are performed under the Pest Detection/Emergency Program – Eradication (PD/EP-E). Activities vary based on target pest and include pesticide application in a residential setting.

As part of the Statewide PEIR (CDFA, 2014a) and a July 2016 supplement for the use of Merit 2F in residential turf settings, nine application scenarios were analyzed in the PD/EP. The application scenarios analyzed in this HHRA are not substantially similar to any of scenarios analyzed previously. In the Statewide PEIR (CDFA, 2014a), Acelepryn® was analyzed in a nursery rather than an urban/residential setting.

In this assessment, a single pesticide, Acelepryn®, was applied in residential/urban settings within a 200 meter radius around beetle detections and includes ground application to turf (including lawns/golf courses), recreational areas, ornamental plants (including flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil). Residential/urban settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. A mechanically pressurized sprayer, backpack sprayer or hand pump is typically used in residential settings; sports fields or other large areas may be treated using a boom sprayer. Spray equipment can be adjusted for low pressure applications close to the ground to reduce or eliminate spray drift. Applications are followed by "watering in" of Acelepryn® through "thatch" and into the soil immediately following a turf spray drench application using similar spray equipment. No adjuvants were included in the application scenarios analyzed.

In a manner consistent with methodology used in the Statewide PEIR (CDFA, 2014a), CDFA defined the Proposed Program as scenarios PD/EP-E-09 and PD/EP-E-10 using the Program Material Data Sheet (PMDS) found in Appendix A: Program Material Data Sheet (PMDS) for PD/EP-E-09 and PD/EP-E-10. The scenario defined application rates (AR) of chlorantraniliprole are 0.136 lb/acre and 0.273 lb/acre, respectively.

To evaluate the different ways in which Acelepryn® may be used on foliage, turf, and ground cover in the Proposed Program, five use scenarios were developed for the HHRA. Three individual scenarios consisted of a mechanically pressurized, hand pump, or backpack sprayer on gardens/trees, a mechanically pressurized sprayer, hand pump, or backpack sprayer on turf followed by watering-in, and a boom sprayer on turf followed by watering-in. Two additional combination scenarios accounted for the possibility of both foliar and turf spray drench applications occurring on the same day. Details as specified in the PMDS were used to characterize these scenarios to allow for exposure estimates to be made in the HHRA.

3.1 Active and Inert Ingredients of Concern and Environmental Fate Properties

The HHRA utilized information found on the Acelepryn® product label and SDS to determine the list of active and inert ingredients. Acelepryn® contains 18.4% chlorantraniliprole as the active ingredient and 81.6% undisclosed inert ingredients. Because inert ingredients are often considered confidential business information, their identity is not disclosed and as a result they could not be assessed. No other chemicals were listed on the label or SDS and therefore could not be evaluated. Chlorantraniliprole was researched for its chemical and physical characteristics, including toxicity, as well as its environmental fate properties.

Although environmental and biological metabolism of chlorantraniliprole generate degradation products, these degradation products are of such low toxicity compared to the parent compound that their contribution to total risk doesn’t affect the outcome of assessment of risk (USEPA, 2008h). Therefore, degradation products are not included in this HHRA.

4 Toxicity Dose-Response Assessment

The second step in the HHRA process is the assessment of toxicity (OEHHA, 2001a). All chemicals have some degree of toxicity and no substances are completely non-toxic. This fundamental concept of toxicology is expressed by Philippus Von Hohenheim (also known as Paracelsus), a 16th century physician and scientist (Pachter, 1951), in his famous maxim: "All things are poison, and nothing is without poison: only the dose permits something not to be poisonous." Accordingly, understanding the toxicity of chlorantraniliprole, and the potential dose that human receptors might receive as part of Proposed Program, is critical. Two fundamentally different toxicological responses may transpire following exposure depending on the end response: cancerous and non-cancerous health effects. Toxicity values are quantitative values that describe the relationship between an estimated dose and the probability of developing cancer or the likelihood of producing non-cancerous health effects.

Non-cancerous health effects (e.g,. difficulty breathing, neurological effects) were evaluated using no observable adverse effect levels (NO(A)ELs). A NO(A)EL is the highest exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its control (USEPA, 1993c). When multiple NO(A)ELs were available in the literature, the most sensitive effect level was selected. All NO(A)ELs used in this assessment are reported in units of milligrams of chlorantraniliprole per kilogram body weight (BW) per day (mg/kg-day). Extrapolations were made and uncertainty factors applied to NO(A)ELs selected from the literature for use in estimating risk. Extrapolation and uncertainty include using animal studies and/or surrogate chemicals. Use of the most sensitive effect level along with conservative extrapolation and uncertainty factors is generally considered health-protective of a representative cross section of the general population.

NO(A)ELs were obtained for chlorantraniliprole for the available and relevant routes of exposure. Refer to section 4.3 for a full discussion on the NO(A)EL selection process.

Because chlorantraniliprole shows no evidence of carcinogenicity, cancer risk was not assessed in this HHRA (USEPA, 2015a).

Toxicity information was gathered on the chemical's carcinogenicity and non-cancerous health effects from government sources including the USEPA (2016b), OEHHA (2016b), Agency for Toxic Substances Disease Registry (ATSDR) (2013), DPR (2012a), Hazardous Substances Data Bank (HSDB) (2012d), United States Department of Agriculture (USDA) (2016a), and Health Canada (2016a).

4.1 Mechanism of Action and Target Organs and Systems

Toxicity studies are often conducted using single chemicals rather than a combination of chemicals that may be found in a specific pesticide formulation. An HHRA typically evaluates each chemical individually, and then combines the risks from multiple chemicals with the same effects to get a final, combined representation of risk. In this HHRA, only chlorantraniliprole was evaluated so no cumulative risk was necessary.

4.2 Data Sources

The toxicity assessment reviewed the following data sources, generally in the order presented below. In the event that no conflicting or suspect data was found, other sources were used to corroborate the initial data found. The most conservative and health-protective data was used when two or more data points existed:

- USEPA Pesticide Fact Sheets (USEPA, 2008h)
- USEPA Reregistration Eligibility Decision (RED) Documents (USEPA, 2012p)
- USEPA Human Health Assessment Scoping Documents (USEPA, 2008f; USEPA, 2010h)
- DPR Risk Characterization Documents (DPR, 2012f)
- ATSDR Toxicological Profile (ATSDR, 2013)
- OEHHA Toxicity Criteria Database (OEHHA, 2007a)
- United Nations Environmental Programme (UNEP) Screening Information Dataset (SIDS) Initial Assessment Profile
- USDA Human Health and Ecological Risk Assessment
- OEHHA Chronic Toxicity Summary
- DPR Toxicology Data Review Summaries (DPR, 2008c)

Data on the physical, chemical, and environmental fate properties (e.g., solubility, soil degradation, dermal absorption, molecular weight, etc.) of chlorantraniliprole were gathered. Property data were gathered from various resources including:

- Hazardous Substances Data Bank (HSDB, 2011d)
- New York State Department of Environmental Conservation (NYSDEC, 2009b)
- USEPA FIFRA Scientific Advisory Panel Meeting Reports (USEPA, 1997i)
- USEPA Human Health Risk Assessments (USEPA, 2008f; USEPA 2010h)

Review of the available literature yielded no new applicable physical, chemical, or environmental fate studies for chlorantraniliprole. Therefore, all physical, chemical, and environmental fate properties utilized in this assessment are consistent with and may be found in the Statewide PEIR (CDFA, 2014a).

4.3 Selection of Toxicity Endpoints for Risk Characterization

Critical NO(A)ELs used for risk characterization of chlorantraniliprole were selected based on findings presented in the United States Environmental Protection Agency (USEPA) Chlorantraniliprole Pesticide Fact Sheet (USEPA, 2008h), USEPA Chlorantraniliprole Human Health Risk Assessment for Proposed Use on Tobacco (USEPA, 2010h), and DPR Toxicological Summary of Chlorantraniliprole (DPR, 2008c). Based on a review of the toxicology database, the following critical NO(A)ELs and endpoints were identified:

Appendix 2A

Table 1: Critical NO(A)ELs and Endpoints for Chlorantraniliprole

Exposure Route	NO(A)EL (mg/kg-d)	Toxicity Endpoint	Study Details
Acute Oral	≥5,000	No adverse effect detected at highest dose tested[1]	Single dose oral gavage in female rats; only three female rats per treatment group were evaluated
Subchronic Oral	≥1,443	No adverse effect detected at highest dose tested[2]	28 day feeding study in mice
Chronic Oral	158	Eosinophilic foci of liver, hepatocellular hypertrophy, and increase in liver weight	18 month feeding study in mice[1,2,3]
Subchronic Dermal	≥1,000	No adverse effect detected at highest dose tested[2]	Chlorantraniliprole applied dermally to rats for 6 hr/day for 28 days

[1]USEPA, 2008h
[2]DPR, 2008c
3USEPA, 2010h

Although numerous studies have evaluated the acute and subchronic toxicity of chlorantraniliprole, few were able to identify adverse effects even at the maximum doses tested. The short-and intermediate-term oral toxicity of chlorantraniliprole have been investigated up to 5,000 mg/kg-d (acute) and 1,443 mg/kg-d (subchronic) without identifying adverse effects (USEPA, 2008h; DPR, 2008c). Although one subchronic feeding study in mice reported foci of necrosis in the liver at doses greater than 538 mg/kg-d, these histological observations did not impact the function of the affected organs (DPR, 2008c). The only study that identified an adverse effect was a chronic 18-month feeding study which identified an oral NO(A)EL of 158 mg/kg-day for effects on the liver (USEPA, 2010h; USEPA, 2008h). Subchronic dermal studies have tested up to 1,000 mg/kg-d without reporting adverse effects (DPR, 2008c).

The USEPA acknowledges the lack of toxicity from acute and subchronic oral, dermal, and inhalation exposure to chlorantraniliprole and deemed it sufficiently non-toxic such that a quantitative risk assessment was not warranted (USEPA, 2010h). However, to be conservative, the maximum tested subchronic dose of 1,443 mg/kg-d from a 28 day oral exposure in mice was used to estimate both acute and subchronic oral risk from incidental ingestion of chlorantraniliprole (DPR, 2008c). Methods for evaluating risk of chemicals in which no adverse effects are observed at the maximum dose tested (i.e., chemicals considered “not of concern” for a particular pathway) are presented in Human Health Risk Assessment of Isomate –European Grapevine Moth (EGVM) (OEHHA, 2010a). Note that the maximum tested acute dose of 5,000 mg/kg was not selected as the point of departure because (1) a single-dose study would not be appropriate for subchronic risk evaluation, (2) few test animals were used in the cited study, and (3) subjects evaluated were female only, possibly overlooking any male-specific sensitivities to chlorantraniliprole. Consistent with the USEPA 2010 Human Health Risk Assessment on the use of chlorantraniliprole on tobacco, the chronic oral NO(A)EL of 158 mg/kg-d was selected to estimate chronic oral risk from incidental ingestion of chlorantraniliprole based on the toxic endpoint of eosinophilic foci of the liver, hepatocellular hypertrophy and increase in liver weight.

Studies evaluating the inhalation toxicity of chlorantraniliprole are limited. Due to the lack of a route-specific NO(A)EL, the selected subchronic oral NO(A)EL of 1,443 mg/kg-d was used to evaluate the acute and subchronic risk due to inhalation exposure. Due to the lack of chronic inhalation studies investigating chlorantraniliprole, the chronic oral NO(A)EL of 158 mg/kg-d was used to evaluate inhalation risk. Because no chemical-specific inhalation absorption factor data are available for chlorantraniliprole, 100% absorption was assumed.

Similar to the acute/subchronic oral endpoint selection, no adverse effect has been reported in dermal toxicity studies. The maximum tested, route-specific dose of 1,000 mg/kg-d was used to estimate risk from the acute/subchronic exposure pathway. Due to the lack of chronic dermal studies for chlorantraniliprole, the chronic oral NO(A)EL of 158 mg/kg-d was used to evaluate chronic dermal risk. Because no chemical-specific dermal absorption factor (DAF) data are available for chlorantraniliprole, 100% absorption was assumed.

Consistent with OEHHA (2016a) turf risk assessment methodology, both acute and subchronic risk for chlorantraniliprole were evaluated for all exposure routes by selecting the subchronic NO(A)EL and comparing to the maximum daily dose that could occur from the maximum number of applications per year under the Proposed Program. This method is protective of both acute and subchronic effects because the subchronic NO(A)EL is lower than the maximum tested acute NO(A)EL.

The critical NO(A)ELs selected for the risk characterization of chlorantraniliprole are summarized in Table 2**.**

Table 2: Critical NO(A)ELs Selected for Risk Characterization of Chlorantraniliprole

Exposure Route	NO(A)EL (mg/kg-d)	Toxicity Endpoint
Acute/Subchronic Oral	1,443	None identified. The highest dose tested was used to characterize risk.
Acute/Subchronic Inhalation	1,443	None identified. The highest dose tested was used to characterize risk.
Acute/Subchronic Dermal	1,000	None identified. The highest dose tested was used to characterize risk.
Chronic Oral	158	Eosinophilic foci of liver, hepatocellular hypertrophy, and increase in liver weight
Chronic Inhalation	158	Eosinophilic foci of liver, hepatocellular hypertrophy, and increase in liver weight
Chronic Dermal	158	Eosinophilic foci of liver, hepatocellular hypertrophy, and increase in liver weight

5 Exposure Assessment

The third step in the HHRA was to estimate how much chlorantraniliprole exposure an individual (referred to as a "receptor" for this HHRA) would receive (OEHHA, 2001a). Exposure is commonly defined as contact of visible external physical boundaries (i.e., external boundaries such as the mouth, nostrils, and skin) with a chemical. Exposure is dependent upon the intensity, frequency, and duration of contact. The intensity of contact is typically expressed in terms of the concentration of chemical per unit mass or volume (i.e., μg/g, μg/L, mg/m^3, ppm, etc.) in the media (i.e., soil, air, water, etc.) to which receptor is exposed. Dose refers to the amount of chemical to which receptors are exposed that crosses the external boundary. Dose is dependent upon chemical concentration and the rate of intake (i.e., inhalation or ingestion) or uptake (i.e., dermal absorption) and may be normalized to receptor body weight as a function of time (i.e., mg/kg-day). The receptor average daily dose (ADD) rates is estimated as shown below:

$$ADD = \frac{C * CR * ED * F}{BW * AT}$$

Where:

ADD = potential average daily dose (mg/kg-day);
C = chemical concentration (mg/L, mg/m^3; mg/cm^2);
CR = contact rate (L/day; m^3/day; cm^2/day);
ED = exposure duration (years);
EF = frequency of exposure events (days/year);
BW = body weight (kg); and
AT = averaging time (days).

The chemical concentration (C), also expressed as an estimated environmental concentration (EEC), refers to the amount of chlorantraniliprole residue in the media of interest, and contact rate refers to the rate of ingestion, inhalation, or dermal deposition per day. Exposure duration refers to the length of time that contact occurs and is affected by activity patterns. For this HHRA, the duration of Proposed Program treatments at a single residence was assumed to be 5 years, which would be an estimate of the longest period of yearly treatment intervals for the Proposed Program. Exposure frequency (EF) is the number of exposure events over a specified time period. Body weight and averaging time (AT) are specific to the receptor and exposure scenarios being evaluated. For chronic exposure, the annual average daily dose (AADD) is calculated using an averaging time factor, which is the number of days over which the exposure is averaged. In this HHRA, the chronic averaging time was assumed to be 5 years, which is consistent with the exposure duration. Absorbed doses may be estimated by applying an absorption factor.

The exposure assessment portion of the HHRA was divided into two parts. The first part was to estimate the concentration of chlorantraniliprole in the environment (the estimated environmental concentration, or EEC) through fate and transport processes. This included estimating the concentration of chlorantraniliprole that may be found in the air, water, soil, and contained in/on the plant. This methodology took into account the total amount of Acelepryn® applied, along with any mechanisms of dispersal or degradation of chlorantraniliprole that may occur during or shortly after application. The next part in determining human exposure (ADD and AADD) was to estimate how much of the EEC would be absorbed by the receptor. The three main uptake pathways addressed in the HHRA were inhalation, ingestion, and dermal absorption. Receptor exposure and EECs are each discussed in further detail below.

5.1 Conceptual Site Model

A conceptual site model (CSM) is a written and graphical presentation of predicted relationships between Acelepryn® application scenarios and receptor exposure (i.e., inhalation, dermal contact, or ingestion). It includes a description of the complete exposure pathways and outlines the primary release mediums, impacted media, and potential routes of exposure for each receptor. A complete exposure pathway exists when chlorantraniliprole can be traced, or expected to travel, from the point of application to a plant, soil, air and eventually a receptor. An exposure pathway that is not complete means that it is unlikely for that receptor to be exposed to chlorantraniliprole through that exposure pathway. The CSM identifies the multiple pathways through which receptors can be exposed to chlorantraniliprole as part of the Proposed Program.

The starting point of the CSM is the application technique which considers the release of Acelepryn® into the environment. The next exposure step following an application depends on the environmental media that chlorantraniliprole reaches after application. Chlorantraniliprole may be found in the soil, air, water, turf, and vegetation, and receptors present at the time of the application. Turf or other plants present within the treated area may be exposed to chlorantraniliprole via direct application and uptake from the soil.

Following an application, the potential exists for off-site movement via aerial drift (hereinafter referred to as “drift”) such that chlorantraniliprole may be present in surface water and adjacent untreated areas. Downwind bystanders (DWBs) may be present and be exposed to chlorantraniliprole by aerial drift through the inhalation or dermal pathways. Note that, for turf and ground cover applications of Acelepryn®, off-site drift is minimal as applications are not made when wind is present, low-pressure nozzles are used, water droplet sizes are large, and all spray is directed at the ground.

Once the chlorantraniliprole is present in an environmental media, three routes of exposure exist for a receptor to become exposed: ingestion, dermal, and inhalation. The CSM for the Proposed Program is presented in Figure 1 below.

Appendix 2A

Figure 1: Japanese Beetle Control Activities Residential Conceptual Site Model

Primary Source	Primary Release	Secondary Source	Impacted Media	Exposure Routes	Mixer/Loader/ Applicator (MLA) (a)	Adult, 2<16 Child, 0<2 Child Downwind Bystander (DWB)	Adult Post-Application Resident (PAR)	2<16 Child Post-Application Resident (PAR)	0<2 Child Post-Application Residents (PAR)	Adult During & Post-Application Residents (DPAR)	2<16 Child During & Post-Application Residents (DPAR)	0<2 Child During & Post-Application Residents (DPAR)
Foliar Sprayers (Backpack, Tank)			Air	Dermal	X	X	O	O	O	X	X	X
				Inhalation	X	X	O	O	O	X	X	X
	Droplets, Vapor, or Mist		Turf/ Ground cover	Dermal	O	O	X	X	X	X	X	X
				Hand-to-Mouth	O	O	O	X	X	O	X	X
				Object-to-Mouth	O	O	O	X	X	O	X	X
				Incid. Ingestion	O	O	O	X (d)	X (d)	O	X (d)	X (d)
			Soil	Dermal	O	O	X	X	X	X	X	X
				Pica/Incid. Ingestion	O	O	O	X	X	O	X	X
		Treated Vegetation	Landscape Vegetation	Dermal	O	O	X	X	X	X	X	O
				Hand-to-Mouth	O	O	O	X	X	O	X	O
				Intent. Ingestion	O	O	X	X	X	X	X	X
				Incid. Ingestion	O	O	O	X (e)	O	O	X (e)	O
Backpack Sprayer Drench + Water-In			Air	Dermal	X	O (b)	O	O	O	O (b)	O (b)	O (b)
				Inhalation	X	O (b)	O	O	O	O (b)	O (b)	O (b)
	Large Droplets	Saturated Soil	Turf/ Ground cover	Dermal	O	O	X	X	X	X	X	X
				Hand-to-Mouth	O	O	O	X	X	O	X	X
				Object-to-Mouth	O	O	O	X	X	O	X	X
				Incid. Ingestion	O	O	O	X (d)	X (d)	O	X (d)	X (d)
			Landscape Vegetation	Dermal	O	O	O	O	O	O	O	O
				Hand-to-Mouth	O	O	O	O	O	O	O	O
				Intent. Ingestion	O	O	X	X	X	X	X	X
				Incid. Ingestion	O	O	O	X (f)	X (f)	O	X (f)	X (f)
			Soil/Thatch	Dermal	O	O	X	X	X	X	X	X
				Pica/Incid. Ingestion	O	O	O	X	X	O	X	X
Ground boom Turf + Water-In			Air	Dermal	X	X (b)	O	O	O	X (b)	X (b)	X (b)
				Inhalation	X	X (b)	O	O	O	X (b)	X (b)	X (b)
	Droplets, Vapor, or Mist	Saturated Soil	Turf	Dermal	O	O	X (c)	X (c)	X (c)	X (c)	X (c)	X (c)
				Hand-to-Mouth	O	O	O	X (c)	X (c)	O	X (c)	X (c)
				Object-to-Mouth	O	O	O	X (c)	X (c)	O	X (c)	X (c)
				Incid. Ingestion	O	O	O	X (c)	X (c)	O	X (c)	X (c)
			Soil/Thatch	Dermal	O	O	X (c)	X (c)	X (c)	X (c)	X (c)	X (c)
				Pica/Incid. Ingestion	O	O	O	X (c)	X (c)	O	X (c)	X (c)

General Notes:
CSM is for PD/EP-Eradication applications to turf and landscape areas that take place in residential environments.
X - Complete Exposure Pathway
O - Incomplete, Inconsequential, or De Minimis Exposure Pathway
Worker exposure scenarios assume that all appropriate personal protective equipment (PPE) is worn according to the product label.

Specific Notes:
(a) Exposure to MLA includes exposure to the product itself during handling.
(b) Resident is assumed to be exposed to drift from a groundboom application to a field and the post-application residues in his/her own yard. Ground-directed handheld sprayer applications are expected to result in De Minimis drift to bystanders.
(c) Complete exposure pathway for the PAR Adult, 2<16 Child, and 0<2 Child exists but is identical to the exposure pathway from Turf and Soil/Thatch in the Backpack Sprayer Drench + Water-In, and will not be duplicated.
(d) Exposure pathway expected to be De Minimis as compared to soil pica ingestion.
(e) Exposure pathway expected to be De Minimis as compared to intentional ingestion of edible vegetation and hand-to-mouth ingestion.
(f) Exposure pathway expected to be De Minimis as compared to intentional ingestion of landscape vegetation.

5.2 Estimating Pesticide Environmental Concentrations

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

Because no empirical data are available for the Proposed Program, EECs are 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 chlorantraniliprole is released into the environment. Typical fate properties that tend to decrease the concentration of chlorantraniliprole include aerobic degradation, anaerobic degradation, water 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 represent 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 are consistent with those used in the Statewide PEIR (CDFA, 2014a). The assumptions that differ between the Proposed Program and the Statewide PEIR (CDFA, 2014a) are presented below.

CDFA defined Acelepryn® application rate for the scenarios PD/EP-E-09 and PD/EP-E-10 are found in Appendix A: Program Material Data Sheet (PMDS) for PD/EP-E-09 and PD/EP-E-10. The scenario defined application rate of chlorantraniliprole is 0.136 lb/acre in PD/EP-E-09 and 0.273 lb/acre in PD/EP-E-10. For combined scenario analysis, we assumed the concurrent application rates of 0.136 lb/acre and 0.273 lb/acre to foliage and turf, respectively.

The chemical and physical properties of chlorantraniliprole in Acelepryn® previously provided in the Statewide PEIR (CDFA, 2014a) were reviewed and compared to the current available literature, were found unchanged and deemed applicable for use. Refer to the Statewide PEIR (CDFA, 2014a) and the relevant sections of the Dashboard Database for physical, chemical, and environmental fate properties of chlorantraniliprole used in this HHRA.

Three types of Acelepryn® applications were modeled in this assessment: foliar spray to ornamental plants, a broadcast spray directly to turf or ornamental ground cover such as low-growing broad-leafed plants, and as a soil application to bare soil under plants. After application to turf and ornamental ground cover, these areas are "watered-in" so Acelepryn® is moved into the soil. After watering in, some Acelepryn® was assumed to remain on the turf or ground cover with the rest deposited into soil. Based on available data, 33% of the applied Acelepryn® was assumed to remain on the vegetation and 67% was assumed to wash off into soil (DPR, 2012g, DPR, 2013c). Because of the comparable water solubility and octanol-water partition coefficient (K_{ow}) of chlorantraniliprole to oxadiazinon and simazine as assessed in the cited DPR studies, the three-fold watering-in reduction factor (WRF) was considered sufficiently applicable. Bare soil areas beneath plants are assumed to have received 100% of the applied Acelepryn®. For foliar application to non-edible vegetation, it was assumed that 80% of the directly applied

Acelepryn® was retained on the surface of target vegetation and 20% drifted to adjacent turf, vegetation, or soil (Linders *et al.*, 2000). This degree of canopy interception (80%) was considered representative for plants likely to be treated as part of the Proposed Program.

5.2.1 Soil

Concentrations in soil below garden plants or in bare spots on lawns were used to estimate exposure from dermal contact and ingestion of soil and ingestion of edible vegetation. The soil was assumed to receive 100% of the Acelepryn® from direct application in turf spray drench application scenarios and 20% of the applied Acelepryn® from drift in foliar applications. Chlorantraniliprole in the soil was assumed to be available for potential exposure directly through soil and through uptake into plant tissue.

Soil concentrations for acute duration exposure conditions are represented by the peak residue concentrations in soils immediately following an application. In the situation that multiple applications over the same year were permitted under the Proposed Program, accumulation of chlorantraniliprole was incorporated by summing the environmental concentrations due to each application and accounting for the first-order rate kinetics environmental degradation. For additional details on estimation methods, refer to the Statewide PEIR Section 2.3.

Soil concentrations for chronic duration exposure conditions represent the daily concentration averaged over a 365-day period. For additional details on estimation methods, refer to the Statewide PEIR Section 2.3. In the Statewide PEIR (CDFA, 2014a), a 31-day daily average soil concentration was used for chronic exposure assessments but was modified to a 365-day daily average to more realistically simulate how a resident may be exposed over one year.

Cholorantraniliprole soil EECs are presented in Section 7.2.

5.2.2 Surface Residues on Non-Edible Vegetation

Chlorantraniliprole EECs on foliar surfaces were used to estimate exposure from dermal contact with plant surfaces. The surface of non-edible vegetation was assumed to intercept 80% of the applied chlorantraniliprole with 20% lost to drift in foliar application scenarios (Linders *et al.*, 2000). This degree of canopy interception (80%) was considered representative for plants likely to be treated as part of the Proposed Program. For the purposes of modeling, broad-leafed vegetation, turf, and ground cover were assumed to have the same properties and environmental characteristics as non-edible vegetation.

Post-application chlorantraniliprole EECs on vegetation that are available for dermal transfer to a receptor's skin are referred to as dislodgeable foliar residue (DFR). The method for estimating the DFR is derived from a modification of the USEPA's Standard Operating Procedures for Residential Pesticide Exposure Assessment (SOP) (USEPA, 2012l) as follows:

Appendix 2A

$$DFR_t = AR * F_{AR} * (1 - F_D)^t * CF_1 * CF_2 * CIF$$

Where:

DFR_t = Dislodgeable foliar residue (t) days after application (µg/cm^2)
AR = Application rate (lb ai/acre)
F_{AR} = Fraction of transferable ai
F_D = Fraction of residue that dissipates per day
t = Time after application (days)
CF_1 = Weight conversion factor (µg/lb)
CF_2 = Area unit conversion factor (acre/cm^2)
CIF = Canopy Interception Factor (%)

The F_{AR} was left unchanged from the default USEPA SOP value of 0.25, and the F_D was modified to reflect the rate at which chlorantraniliprole dissipates per day. The F_D was calculated by determining the percent of chlorantraniliprole remaining 1 day after application, using the foliar half-life of 15.33 days and the equation for first order rate kinetics (USEPA, 2008f; USEPA, 2012l). Using this method, the residue concentration after 1 day was calculated to be 95.58%; therefore, the percent of chlorantraniliprole residue that dissipates per day is 4.42%. The equation of first order rate kinetics is given below:

$$C_t = C_O e^{-kt}$$

Where:

C_t = Concentration on Day t following the application
C_0 = Concentration on Day 0 (immediately following application)
e = 2.718
k = 0.693/half life
t = time (days)

A summary of the exposure factors used in estimating DFR is given in Table 3.

Table 3: Exposure Factors Used in Estimating DFR

F_{AR}	F_D	t (days)	CIF	Foliar Half-Life (days)
0.25	0.0442	0-365	0.8	15.33

For estimating residue concentrations for acute/subchronic exposures, dermal contact was assumed to occur immediately after application without any degradation, and the DFR value represents the peak concentration following an application. For chronic exposures, dermal contact was assumed to occur every day for 365 days, so the estimated daily foliar concentration was averaged over a 365-day period. The chronic DFR value represents the 365-day average concentration on foliage assessed over the course of a year, taking into account the maximum allowable number of applications and potential for chlorantraniliprole accumulation under the Proposed Program. Note that application of Acelepryn® requires a 4 hour restricted entry interval

(REI) that prohibits entry into a treated area for 4 hours. The assumption in this HHRA of dermal contact immediately after application is health conservative and over-estimates exposure by assuming that the REI is ignored. Assuming that the REI is followed, actual receptor exposure will be less than assumed in this HHRA.

DFR concentration results are presented in Section 7.2.

5.2.3 Transferable Turf Residue

In turf spray drench application scenarios, turf and ground cover were assumed to receive 100% of the applied Acelepryn®. For estimating residue concentrations available for dermal exposures in turf spray drench applications, 33% of the applied Acelepryn® was assumed to remain on the turf surface after “watering-in” (DPR, 2012g, DPR, 2013c). The “watering-in effect” was expressed as a watering-in reduction factor (WRF) of 0.66 in the applicable equations in this HHRA. In foliar application scenarios, 20% of the pesticide applied to foliage was assumed to drift onto turf. No WRF was used for chlorantraniliprole in turf due to drift.

Post-application chlorantraniliprole on turf surfaces that are available for dermal transfer to a receptor’s skin are referred to as transferable turf residues (TTRs). The method for estimating the TTR was selected from USEPA’s Standard Operating Procedures for Residential Pesticide Exposure Assessment (SOP) (USEPA, 2012l). The following equation was used to estimate the TTR:

$$TTR_t = AR * F_{AR} * (1 - F_D)^t * CF_1 * CF_2 * (1 - WRF) * Dt$$

Where:

TTR_t = Transferable turf residue (t) days after application (µg/cm^2)
AR = Application rate (lb ai/acre)
F_{AR} = Fraction of transferable ai
F_D = Fraction of residue that dissipates per day
t = Time after application (days)
CF_1 = Weight conversion factor (µg/lb)
CF_2 = Area unit conversion factor (acre/cm^2)
WRF = Watering-in reduction factor
DtT = Drift to Turf (%)

The F_{AR} was left unchanged from the default USEPA SOP value of 0.01, and the F_D was modified to reflect the rate at which chlorantraniliprole dissipates per day. The F_D was calculated by determining the percent of chlorantraniliprole remaining 1 day after application, using the foliar half-life of 15.33 days and the equation for first order rate kinetics (USEPA, 2008f). Using this method, the residue concentration after 1 day was calculated to be 95.58%; therefore, the percent of chlorantraniliprole that dissipates per day is 4.42%. The equation of first order rate kinetics is as follows:

$$C_t = C_0 e^{-kt}$$

Where:

C_t = Concentration on Day t following the application
C_0 = Concentration on Day 0 (immediately following application)
e = 2.718
k = 0.693/half life
t = time (days)

A summary of the exposure factors used in estimating TTR is given in Table 4.

Table 4: Exposure Factors Used in Estimating TTR

Application Method	F_{AR}	F_D	t (days)	WRF	DtT	Foliar Half-Life (days)
Foliar	0.01	0.0442	0-365	0	0.2	15.33
Turf	0.01	0.0442	0-365	0.66	1	15.33

For estimating chlorantraniliprole concentrations for acute/subchronic exposures, dermal contact was assumed to occur immediately after application without any degradation, and the TTR value represents the peak concentration following an application. For chronic exposures, dermal contact was assumed to occur every day for 365 days, so the estimated daily TTR was averaged over a 365-day period. The chronic TTR value represents the 365-day average concentration on turf assessed over the course of a year, taking into account the possibility of chlorantraniliprole accumulation where multiple applications are done under the Proposed Program.

TTR concentration results are presented in Section 7.2.

5.2.4 Edible Vegetation Residue

Uptake by plants from soil was estimated in a manner similar to that used in the ERA of the Statewide PEIR (CDFA, 2014a) with the exception that a revised Briggs' Equation was used based on the updated version in USEPA (2014a). Complete details regarding how the Briggs' equation is used appear in the Statewide PEIR (CDFA, 2014a). Consistent with guidance in USEPA (2014a), if the Log K_{ow} was greater than 5.0, no uptake was assumed. When the Log K_{ow} is negative, the Transpiration Stream Concentration Factor (TSCF) is assumed to be 1.0 (Collins et al., 2006).

For estimating chlorantraniliprole concentrations in edible vegetation for acute/subchronic and chronic exposures, uptake by plants from soil was conservatively assumed to occur without any degradation, and tissue concentrations were represented by the peak concentration. For assessing the concentration of chlorantraniliprole in the tissue of edible vegetation due to drift, it was assumed 20% and 100% of chlorantraniliprole was available for uptake in soil for foliar and turf spray drench application, respectively.

Appendix 2A

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 Briggs' equation is 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} are from Pesticide Root Zone Model (PRZM) data for California residential soil profiles for Tierra soils. Please see the Surface Water Concentrations of Pesticide Active and Inert Ingredients and Adjuvants section of the ERA for more details. The total concentration of chlorantraniliprole in plant tissue was estimated by multiplying the Terrestrial VUF, the concentration of chlorantraniliprole in soil, and the % chlorantraniliprole available in the soil seen below.

$$EEC_{Briggs} = VUF * \text{Soil Concentration}$$

In accordance with the Acelepryn® label, it was assumed that no direct application to edible vegetation occurs under the Proposed Program. Nonetheless, this HHRA accounts for the possibility of 20% drift from spray of adjacent foliage onto the vegetation surface (Linders et al., 2000). This degree of canopy interception (80%) was considered representative of plants likely to be treated as part of the Proposed Program. Exposure to chlorantraniliprole on edible vegetation surfaces via drift is unlikely as best management practices are used during application, including tarping of proximal edible foliage. Turf scenarios assumed no Acelepryn® is directly applied to foliage.

To estimate surface residues on edible foliage due to drift, the USEPA's Terrestrial Residue EXposure (T-REX) model (Version 1.5; USEPA, 2012i) was used. Using chemical-specific data, T-REX estimated the chlorantraniliprole concentrations on terrestrial vegetation. Receptors were assumed to consume vegetation from the fruits and seeds category. For more details, please see the Statewide PEIR (CDFA, 2014a) and HHRA Report.

Chlorantraniliprole concentrations in edible vegetation for acute/subchronic duration exposure conditions are represented by the peak residue concentrations. In the situation that multiple applications over the same year occur under the Proposed Program, accumulation of chlorantraniliprole was incorporated by summing the environmental concentrations due to each application and accounting for the first-order kinetics environmental degradation. For additional details on estimation methods, refer to the Statewide PEIR Section 2.3 (CDFA, 2014a).

To estimate the chronic incidental ingestion of chlorantraniliprole residues in and on fruit and vegetables, the acute edible vegetation EEC was used to estimate the chronic exposure. This method overestimates exposure to pesticide residues from consumption of edible vegetation because the peak concentration is assumed constant over the year (i.e., the peak concentration of chlorantraniliprole does not degrade) and the seasonal nature of fruit and vegetables make repeated exposures from this route throught the entire year unlikely. However, this methodology is health protective of the chronic scenario and was estimated for the sake of completeness.

The exposure factors used in estimating chlorantraniliprole concentrations in edible vegetation are summarized in Table 5

Table 5 Exposure Factors Used in Estimating Edible Vegetation Residues

Application Target	Log K_{ow}	ρ (g/cm$^{3)}$	θ (cm^3/cm$^{3)}$	K_{oc} $($cm^3/g)	f_{oc}	Soil EEC (mg/kg)	Drift (T-Rex)
Foliar	2.81	1.5	0.309	328	1.74	See Section 7.2	0.2
Turf						See Section 7.2	0

Edible vegetation residue concentration results are presented in Section 7.2.

5.2.5 Pesticide Off-target Drift

Off-target drift of Acelepryn® was estimated in a similar manner as presented in the Statewide PEIR (CDFA, 2014a). Methods for assessing ground applications in AgDRIFT were followed, and in accordance with USEPA's *Overview of Issues Related to the Standard Operating Procedures for Residential Exposure Assessment* (USEPA, 1999f), a "Flagger" unit exposure (UE) from USEPA's *Occupational Pesticide Handler Exposure Database* (OPHED) (USEPA, 2015b) was used to assess exposure to off-target drift. Refer to Section 4.2.1.4.3 Pesticide Off-target Drift and Section 4.2.1.6.5 Downwind-Bystander of the Statewide PEIR (CDFA, 2014a) for additional details.

Flagger unit exposures and AgDRIFT estimated percent deposition are presented in Section 7.2.

5.2.6 Occupational Exposure Values

For occupation exposure assessments (e.g., mixer-loader-applicator), unit exposures from USEPA's OPHED (USEPA, 2015b) were selected in accordance with methods described in USEPA's *Review of Worker Exposure Assessment Methods* (USEPA, 2007k). Selection of unit exposures was completed in a similar manner as presented in the Statewide PEIR (CDFA, 2014a). Refer to Section 4.2.1.6.1 Mixer-Loader-Applicator of the Statewide PEIR (CDFA, 2014a) for additional details.

Occupational unit exposures selected are presented in Section 7.2.

5.2.7 Water Ingestion, Surfacewater, and Groundwater

Databases from authoritative and reliable sources such as the State Water Resources Control Board (SWRCB) California Environmental Data Exchange Network (CEDEN) and the California Department of Pesticide Regulation (DPR) database were queried for data on impacts to drinking water quality from the Proposed Program. Refer to the Statewide PEIR (CDFA, 2014a) for presentation of the results.

Based on the surface water data available from the CEDEN and DPR Surface Water (SURF) databases, chlorantraniliprole has not been reported in sources of surface drinking water (SWRCB, 2016a; DPR, 2016a). Based on the last 6 years of ground water data (2011-2016) from DPR's Well Inventory Database, chlorantraniliprole has not been reported in ground water (DPR, 2016b).

Because of the lack of detections in surface water and ground water, exposure to chlorantraniliprole in drinking water by the ingestion pathway from these sources is not expected to occur. Accordingly, this pathway was not assessed.

5.3 Estimating Human Receptor Exposure

The exposure assessment estimates the dose, or amount of chlorantraniliprole that different receptors may be exposed to under different application scenarios that would be a part of the Proposed Program. The exposure to chlorantraniliprole varies for different types of receptors depending on the activities of a particular receptor and proximity to the application site. The following four types of receptors were assessed in this HHRA:

- Mixer-Loader-Applicator (MLA): Acelepryn® handlers
- Downwind Bystander (DWB): Residents or workers near the Acelepryn® application site during application
- Post-Application Resident (PAR): Residents in the yard after Acelepryn® application
- During & Post-Application Residents (DPAR): Residents near the Acelepryn® application site during application and in yard after application

The potential health impacts, if any, to receptors can be estimated by comparing estimated exposure doses with the measures of toxicity. Descriptions of the methodology used to assess toxicity are described in Section 6.1.

5.3.1 Exposure Routes

Depending on the activities and location of a particular receptor, nine exposure routes could potentially occur under acute/subchronic and chronic duration exposure scenarios. The exposure routes considered in this HHRA are the following:

- Inhalation: Aerosols and vapors
- Ingestion of Edible Vegetation Residues: Eating home-grown edible vegetation (fruits and vegetables)
- Dermal Exposure to Residues on Vegetation: Contact to skin due to working or playing in treated areas
- Hand-to-Mouth Ingestion of Vegetation Residues: Unintentional ingestion of residue from vegetation through hand-to-mouth transfer
- Dermal Exposure to Residues on Turf: Contact to skin due to activities in treated areas
- Hand-to-Mouth Ingestion of Turf Residues: Unintentional ingestion of residue from activities on turf through hand-to-mouth transfer
- Object-to-Mouth Ingestion of Turf Residues: Unintentional ingestion of residue from activities on turf through object-to-mouth transfer
- Pica and Incidental Ingestion of Soil Residues: Deliberate and unintentional soil consumption
- Dermal Exposure to Residues in Soil: Skin contact due to working or playing in treated areas

Ground water and surface water ingestion exposure was not assessed as explained in Section 5.2.7.

5.3.2 Exposed Populations (Receptors)

A description of each of the four receptors identified in Section 5.3 is provided below. These receptor groups represent the groups with reasonable potential for exposure during the Proposed Program.

5.3.2.1 Mixer-Loader-Applicator

The mixer-loader-applicator (MLA) represents the combination exposure of a worker who may be occupationally exposed to chlorantraniliprole while loading, mixing and applying Acelepryn®. The MLA is assumed to be exposed through dermal and inhalation routes. Ingestion was not evaluated for this receptor because the applicator is properly trained to minimize any hand-to-mouth transfers.

5.3.2.1.1 Mixer-Loader-Applicator Acute/Subchronic Exposure Assessment

Acute exposure for the MLA was evaluated in the same manner as in the Statewide PEIR (CDFA, 2014a). Refer to the Statewide PEIR Appendix B Section 2.3 (CDFA, 2014a) for exposure assessment methodology. USEPA's Occupational Pesticide Handler Exposure Database (OPHED) was most recently updated in September 2015, and unit exposure values were selected from the updated version (USEPA, 2015b). Refer to Section 7.2 for the OPHED unit exposures used for estimating exposure to the MLA.

5.3.2.1.2 Mixer-Loader-Applicator Chronic Non-cancer Exposure Assessment

Chronic exposure for the MLA was evaluated in the same manner as in the Statewide PEIR. Refer to the Statewide PEIR Appendix B Section 2.3 (CDFA, 2014a) for exposure assessment methodology.

5.3.2.1.3 Mixer-Loader-Applicator Cancer Exposure Assessment

Chronic exposure for cancer assessment was not characterized in this risk assessment because chlorantraniliprole shows no evidence of carcinogenicity (USEPA, 2015a).

5.3.2.2 Post-Application Resident

The post-application resident (PAR) represents a typical receptor living in an urban or residential environment who has the potential to be exposed after treatments have been conducted under the Proposed Program. The PAR was conservatively assumed to be active in the gardens and lawns on his/her property and to consume home-grown edible vegetation (i.e., fruits and vegetables). An adult resident was assumed to be exposed to residues on foliage, turf, and soil through dermal contact and through ingestion of home-grown edible vegetation. Child residents, ages 0-<2 years old and 2-<16 years old, were assumed to be exposed to residues on foliage, turf, and soil through dermal contact, incidental ingestion of residues on turf from hand-to-mouth and object-to-mouth activity, incidental ingestion of residues on foliage from hand-to-mouth activity, and ingestion of home-grown edible vegetation and soil. Post-application inhalation exposure to chlorantraniliprole was not considered because of its low vapor pressure (1.58E-13 mmHg). Additionally, for turf spray drench application, Acelepryn® is watered in into the soil immediately after application, which is expected to further diminish the potential for post-application volatilization.

For the purposes of this risk assessment, the resident was analyzed over three lifestages: 0-<2 year-old child, 2-<16 year-old child, and a 16-<70 year-old adult (USEPA, 2005q). In order to estimate potential exposure for these three age-groups, guidance and exposure factors from sources including, but not limited to, USEPA's Standard Operating Procedures for Residential Pesticide Exposure Assessment (SOP) (USEPA, 2012l), USEPA's Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989e, USEPA, 2014d), and USEPA's Exposure Factor's Handbook (EFH) (USEPA, 2011p) were selected. If exposure factors from various age-ranges (e.g., 3-<6 year-old, 6-<11 year-old, etc.) within each lifestage (e.g., 2-<16 year-old child) were available, the exposure factor from the age-range that resulted in the highest exposure was selected for each lifestage. Using this approach resulted in the use of exposure factors that are health-protective for the entire lifestage. The SOP designates "index lifestages" for specific exposure assessments. An index lifestage represents "the lifestage of highest concern due to unique behavioral characteristics that may lead to higher levels of exposure." The USEPA determined these index lifestages through both "quantitative (e.g., exposure assessments) and qualitative (e.g., exposure and activity data) considerations," and assessment of the index lifestage is expected to "protect for the exposures and risks for all potentially exposed lifestages" (USEPA, 2012l). For estimating potential exposure in this risk assessment, the SOP index lifestage was assessed using the SOP guidance when available.

5.3.2.2.1 Post-Application Resident Acute/Subchronic Exposure Assessment

Ingestion of Edible Vegetation Residues

The 0-<2 year-old child, 2-<16 year-old child, and the adult PAR were assumed to be exposed to chlorantraniliprole residues through consumption of edible vegetation (i.e., home-grown fruit). Although CDFA maintains spray buffers (i.e., 12 inches beyond the dripline) around edible vegetation, chlorantraniliprole was assumed to be translocated from the soil through the roots of edible vegetation plants. Methods for estimating pesticide residue concentrations in plants are described in Section 5.2.4. When evaluating foliar application, it was assumed that treatment of adjacent vegetation resulted in 20% of the applied material drifting to the surface of fruit-bearing plants and the soil below fruit-bearing plants. For turf spray drench applications, 100% of the applied material was assumed to be available in the soil below fruit-bearing plants for translocation into edible vegetation. Direct spray of chlorantraniliprole on or below edible vegetation is not currently permitted under the Proposed Program, and residents are instructed not to plant edible vegetation in soil treated with chlorantraniliprole for one year after application.

Methods and exposure factors from the USEPA's RAGS (USEPA, 1989e) and USEPA EFH (USEPA, 2011p) were used in this assessment. Exposure factors for a 1-<2 years old and a 3-<5 years old were selected to represent these index lifestages (ILS) for the 0-<2 year-old child and 2-<16 year-old child PARs, respectively. To estimate the ADD, the maximum estimated environmental concentration of chlorantraniliprole in edible vegetation, listed in section 7.2, was multiplied by the amount of vegetation a resident was expected to consume per day relative to his/her body weight. For the 0-<2 year-old child PAR assessment, a vegetation ingestion rate of 8.7 g/kg-day, based on mean intake of home-produced fruits for a 1-2 years old, was selected from USEPA's EFH (USEPA, 2011p). For the 2-<16 year-old child PAR assessment, a vegetation ingestion rate of 4.1 g/kg-day, based on mean intake of home-produced fruits for a 3-5 years old, was selected from USEPA's EFH (USEPA, 2011p). For the adult PAR assessment, a vegetation ingestion rate of 2.7 g/kg-day, based on mean intake of home-produced fruits for a 40-69 years old, was selected from USEPA's EFH (USEPA, 2011p). The following equation was used to estimate the ADD:

$$ADD = EEC * CF * IR_v$$

Where:

ADD = Average daily dose (mg/kg-day)
EEC = Estimated environmental concentration (mg/kg)
CF = Conversion factor (kg/g)
IRv = Vegetation ingestion rate (g/kg-day)

A summary of the exposure factors used in estimating acute/subchronic exposure to residues through ingestion of edible vegetation is given in Table 6.

Table 6: Exposure Factors Used in Estimating Acute/Subchronic Exposures to Residues through Ingestion of Edible Vegetation

Receptor	ILS	EEC (mg/kg)	IR_v (g/kg-day)[1]
0-<2 PAR	1-<2 years	Refer to Section 7.2	8.7
2-<16 PAR	2-<5 years		4.1
Adult PAR	40-<69 years		2.7

1. Mean intake of home-grown vegetation from EFH (USEPA, 2011p)

Dermal Exposure to Vegetation

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and the adult PAR were assumed to be exposed to chlorantraniliprole residues through dermal contact with residues on garden plants and trees. Methods and exposure factors from the "Gardens" category in the Gardens and Trees section of the USEPA's SOP (USEPA, 2012l) were used in this assessment. Exposure factors for a 1-<2 year-old and a 6-<11 year-old were selected to represent the 0-<2 year-old child and 2-<16 year-old child PARs, respectively.

The first step of the Gardens and Trees SOP equation was to estimate the DFR of the desired pesticide active or inert ingredient. The DFR represents the amount of material on the surface of a plant that is available for dermal transfer to a receptor's skin after an application has occurred (USEPA, 2012l). For additional details of the methods for estimating the surface residue on foliage, refer to 5.2.2. The SOP makes use of transfer coefficients (Tc) to estimate the transfer of residue from leaf surface to skin. The Tcs recommended by the SOP for use in garden settings were 8,400 cm^2/hr for an adult, 4,600 cm^2/hr for a child 6-<11 years old, and 2,268 cm^2/hr for a child 1-<2 years old. In order to estimate the PAR's ADD, the DFR was multiplied by the surface-to-skin transfer coefficient and the number of hours per day the resident was expected to be exposed, and then divided by the resident's body weight. The SOP assumed the adult was exposed for 2.2 hours per day and weighed 80 kg (USEPA, 2012l). The 6-<11 year-old child was assumed to be exposed for 1.1 hours per day and weighed 32 kg (USEPA, 2012l). The 1-<2 year-old child was assumed to be exposed for 1.1 hours per day and weigh 11.4 kg. The following equation was used to estimate the ADD:

$$ADD = \frac{DFR_t * CF_3 * Tc * ET * DAF}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
DFR_t = Dislodgeable foliar residue (t) days after application (ug/cm^2)
CF_3 = Weight unit conversion factor (mg/ug)
Tc = Transfer coefficient (cm^2/hour)
ET = Exposure time (hours)
DAF = Dermal absorption factor
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute exposure to residues through dermal exposure to vegetation is given in Table 7.

Table 7: Exposure Factors Used in Estimating Acute/Subchronic Dermal Exposure to Vegetation

Receptor	ILS	Tc[1] (cm^2/hour)	ET[1] (hours)	DAF	BW[1] (kg)
0-<2 PAR	1-<2 years	2,268[2]	1.1	1	11.4
2-<16 PAR	6-<11 years	4,600	1.1		32
Adult PAR	Adult	8,400	2.2		80

1. Arithmetic mean
2. No TC available for 1-<2 year old PAR. 73% TC reduction of adult TC as recommended in SOP (USEPA, 2012l)

Hand-to-Mouth Ingestion of Vegetation Residues

The 0-<2 year-old child and 2-<16 year-old child PAR were assumed to potentially be exposed to chlorantraniliprole by contacting residues on vegetation and then transferring that residue from his/her hand to mouth. The USEPA's SOP (USEPA, 2012l) for Lawns/Turf was the method used to evaluate hand-to-mouth ingestion of vegetation residues. Although a SOP for Gardens and Trees is available, it does not include a hand-to-mouth analysis; therefore, the Lawns/Turf SOP was chosen as a surrogate. In accordance with the USEPA SOP, the adult PAR was not assessed for hand-to-mouth incidental ingestion of residues because it is assumed adults would not place pesticide-contaminated hands in their mouth (USEPA 2012l). See the Statewide PEIR (CDFA, 2014a) for more details.

In accordance with the SOP, the dermal contact with vegetation exposure value, which was estimated using the Dermal Exposure to Vegetation section of this HHRA, was multiplied by the fraction of residue on the child's hands compared to total surface residue. The result was then divided by the typical surface area of a child's hands to estimate the potential amount of residue available on the PAR child's hands (USEPA, 2011p; USEPA 2012l).

$$HR = \frac{Fai_{Hands} * VDE}{2 * \mathrm{SA_H}}$$

Where:

HR = Residue available on hand (mg/cm^2)
Fai_{Hands}= Fraction of total residue on hands
VDE = Vegetative dermal exposure (mg)
SA_H = Hand surface area (cm^2)

In order to find the ADD, the SOP then factored in the fraction of hand surface area mouthed each event, the typical surface area of one hand, the number of hours per day the child may be exposed, the number of times the child contacts treated vegetation per hour, the fraction of residue removed from saliva, the frequency of hand-to-mouth contacts per hour, and the child PAR's body weight (USEPA, 2012l). Like the Dermal Exposure to Vegetation assessment, exposure factors for a 1-<2 years old and a 3-<6 years old were selected from the Lawns/Turf SOP to represent the 0-<2 year-old child and 2-<16 year-old child PARs, respectively.

$$ADD = \frac{HR * F_M * SA_H * N_{Rep} * \left(1 - (1 - SE)^{\frac{EV_{HtM}}{N_{Rep}}}\right)}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
HR = Residue available on hand (mg/cm^2)
FM = Fraction of hand surface area mouthed per event
SA_H = Hand surface area (cm^2)
ET = Exposure time (hours/day)
N_{Rep} = Number of replenishment intervals per hour (intervals/hour)
SE = Extraction by saliva
EV_{HtM} = Frequency of Hand-to-Mouth events per hour (events/hour)
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute/subchronic hand-to-mouth incidental ingestion to vegetation residue is given in Table 8.

Table 8: Exposure Factors Used in Estimating Acute/Subchronic Hand-to-Mouth Ingestion to Vegetation Residues

<table>
<tr><th>Receptor</th><th>ILS</th><th>Fai_{hands}[1]</th><th>SA_H[1,2] (cm^2)</th><th>F_M[1]</th><th>ET[1] (hours/ day)</th><th>N_{Rep}[1] (intervals/ hour)</th><th>SE</th><th>EV_{HtM}[1] (events/ hour)</th><th>BW[1,2] (kg)</th></tr>
<tr><td>0 -<2 PAR</td><td>1-<2 years</td><td rowspan="2">0.06</td><td>150</td><td rowspan="2">0.127</td><td rowspan="2">1.5</td><td rowspan="2">4</td><td rowspan="2">0.48</td><td>13.9</td><td>11.4</td></tr>
<tr><td>2 -<16 PAR</td><td>3-<6 years</td><td>225</td><td>8.5</td><td>18.6</td></tr>
</table>

1. Mean or “typical” value from SOP (USEPA, 2012l)
2. EFH (USEPA, 2011p)

Dermal Exposure to Residues on Turf

The 0-<2 year-old child, 2-<16 year-old child, and adult PAR’s dermal exposure to chlorantraniliprole residues on turf were assessed using USEPA’s SOP guidance for “Lawns/Turf - High Contact Lawn Activities”. In accordance with the SOP, the 1-<2 year-old PAR served as the ILS for the 0-<2 year-old. Although the 1-<2 year-old is not expected to receive as much exposure as older children in lawns/turf settings due to behavioral tendencies, risk was still estimated for the 0-<2 year-old PAR for the sake of completeness (USEPA, 2012l). The 2-<3 year-old child represented the 2-<16 year-old PAR.The first step of the Lawns/Turf SOP equation was to estimate the Transferable Turf Residue (TTR) of chlorantraniliprole. Refer to Section 5.2.3 for the TTR equation and additional details.

The SOP recommended transfer coefficients (Tc) were used to estimate the transfer of residue from turf-surface to skin. The recommended Tcs were 49,000 cm^2/hour for a 1-<2 years old, 56,000 cm^2/hour for a 2-<3 years old, and 180,000 cm^2/hour for an adult (USEPA, 2012l). For the definition of Tcs, refer to Appendix B Section 2.3 of the Statewide PEIR (CDFA, 2014a). The default exposure factors used in the SOP for a child 1-<2 years old, a child 2-<3 years old, and an adult were left unchanged for the assessment of the 0-<2 year-old child PAR, 2-<16 year-old child PAR, and adult PAR, respectively.

In order to estimate the PAR’s Average Daily Dose (ADD), the TTR was multiplied by the Tc, the number of hours per day the resident was expected to be exposed (i.e., exposure time), and a dermal absorption factor, and then divided by the resident’s body weight. The following equation was used to estimate the ADD:

$$ADD = \frac{TTR_t * CF * Tc * ET * DAF}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
TTR_t = Transferable turf residue (t) days after application (ug/cm^2)
CF= Weight unit conversion factor (mg/ug)
Tc = Transfer coefficient (cm^2/hour)
ET = Exposure time (hours)
DAF = Dermal absorption factor
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute/subchronic dermal exposure to turf is given in Table 9.

Table 9: Exposure Factors Used in Estimating Acute/Subchronic Dermal Exposure to Turf

Receptor	ILS	Tc (cm^2/hour)[1]	ET (hours)[1]	DAF	BW (kg)[1,2]
0-<2 PAR	1-<2 years	49,000	1.5	1	11.4
2-<16 PAR	2-<3 years	56,000			13.8
Adult PAR	Adult	180,000			80

1. Mean value from SOP (USEPA, 2012l)
2. EFH (USEPA, 2011p)

Hand-to-Mouth Ingestion of Turf Residues

The 0-<2 year-old child PAR and 2-<16 year-old child PAR were assumed to come into contact with chlorantraniliprole by contacting residues on turf and then transferring that residue from his/her hand to mouth. Due to the higher likelihood of children placing their hands in their mouths, estimations of incidental ingestion for the two child PARs were considered health protective of the adult PAR. The USEPA's SOP (USEPA, 2012l) guidance for Lawns/Turf was used as a source of exposure factors and methods. Exposure factors for the ILS of 1-<2 year-old and a 3-<6 year-old were selected to represent the 0-<2 year-old child PAR and the 2-<16 year-old child PAR, respectively.

In accordance with the SOP, the dermal contact with turf exposure value (TDE), which was estimated using the TTR, dermal transfer coefficients, and exposure time in the Dermal Exposure to Residues on Turf assessment (above), was multiplied by the fraction of total residue on the child's hands compared to total body surface residue from the study used to derive the SOP's turf dermal transfer coefficient. The result was then divided by the typical surface area of a child's hands to estimate the potential amount of residue available on the PAR child's hands (HR). The following equation was used to estimate the HR:

$$HR = \frac{Fai_{hands} * TDE}{SA_H * 2}$$

Where:
HR = Residue available on hand (mg/cm^2)
Fai_{hands} = Fraction of total residue on hands
TDE = Turf dermal exposure (mg)
SA_H = Hand surface area (cm^2)

To estimate the ADD, the SOP accounts for the fraction of hand surface area mouthed each event, the typical surface area of one hand, the number of hours per day the child may be exposed, the number of times the child contacts treated turf per hour, the fraction of residue removed from saliva, the frequency of hand-to-mouth contacts per hour, and the child PAR's body weight (USEPA, 2012l). The following equation was used to estimate the ADD:

$$ADD = \frac{HR * F_M * SA_H * ET * N_{Rep} * (1 - (1 - SE)^{EV_{HtM}/N_{Rep}})}{BW}$$

Where:
ADD = Average daily dose (mg/kg-day)
HR = Residue available on hand (mg/cm^2)
F_M = Fraction of hand surface area mouthed per event
SA_H = Hand surface area (cm^2)
ET = Exposure time (hours/day)
N_{Rep} = Number of replenishment intervals per hour (intervals/hour)
SE = Extraction by saliva
EV_{HtM} = Frequency of Hand-to-Mouth (events/hour)
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute/subchronic hand-to-mouth ingestion of turf residues is given in Table 10.

Table 10: Exposure Factors Used in Estimating Acute/Subchronic Hand-to-Mouth Ingestion of Turf Residues

Receptor	ILS	Fai_{hands} [1]	SA_H (cm^2)[1]	F_M [1]	ET [1] (hours/ day)	N_{Rep} [1] (intervals/ hr)	SE	EV_{HtM} (events/ hour)[1]	BW (kg)[1]
0 -<2 PAR	1-<2 years	0.06	150	0.127	1.5	4	0.48	13.9	11.4
2 -<16 PAR	3-<6 years		225					8.5	18.6

1. Mean or "typical" value from SOP (USEPA, 2012l)
2. EFH (USEPA, 2011p)

Appendix 2A

Object-to-Mouth Ingestion of Turf Residues

Both the 0-<2 years old and 2-<16 years old child PARs were assumed to come into contact with chlorantraniliprole through turf-to-object contact that subsequently transferred to his/her mouth from the object. Due to the higher likelihood of children placing objects in their mouth, estimations of incidental ingestion of the two child PARs were considered health protective of the adult PAR. The USEPA's SOP (USEPA, 2012l) guidance for Lawns/Turf was used as a source of exposure factors and methods. Exposure factors for a 1-<2 year-old and a 2-<3 year-old were selected to represent the 0-<2 year-old child and 2-<16 year-old child PARs, respectively.

To estimate the potential amount of residue available on an object (OR_t), a variation of the equation found in the USEPA SOP was used. Consistent with a personal communication with Jeff Dawson of the USEPA on July 20th, 2016, the application rate was multiplied by the fraction of total residue on the object and the dissipation rate (Dawson, J., USEPA Office of Pesticide Program 2016, Pers comm, E-mail RE: Inquiry into the SOP Procedures for Assessing Residential Pesticide Exposure (2012) methodology). It was assumed the dissipation of pesticide residue on an object was comparable to the degradation on foliage; as such, the foliar half-life of 15.33 days was used to estimate the concentration of chlorantraniliprole on the object over time. See Section 5.2.2 for more details on the use of first-order rate kinetics to estimate environmental degradation. A 3-fold reduction factor was applied to the OR_t for turf spray drench applications based on the reduction of residue available for transfer on the turf surface after the application has been watered-in (DPR, 2013c). No watering-in reduction was considered for pesticide residues on turf due to foliar drift. A 20% Drift to Turf (DtO) was applied in foliar applications to account for residues blocked by foliage. In the case of turf spray drench application, it was assumed chlorantraniliprole is directly applied to the object. However, direct application of chlorantraniliprole to objects is unlikely due to implementation of Best Management Practices (BMPs) that protect unintended targets from pesticide drift or direct spray with the use of tarps and coverings. Therefore, this method of assuming direct spray to objects likely overestimates true exposure. The following equation was used to estimate the OR_t:

$$OR_t = AR * F_O * (1 - FD)^t * CF_1 * CF_2 * (1 - WRF) * DtO$$

Where:

OR_t = Residue available on object (µg/cm^2)
AR = Application rate (lb ai/acre)
F_O = Fraction of total residue on object
F_D = Fraction of residue that dissipates per day
t = Time after application (days)
CF_1 = Weight unit conversion factor (µg/lb)
CF_2 = Area unit conversion factor (acre/cm^2)
WRF = Watering-in reduction factor
DtO = Drift to Object

To estimate the ADD, the SOP accounts for the residue available on the object, the object surface area mouthed for each event, the number of hours per day the child is assumed to be exposed (i.e., exposure time), the number of times the object contacts treated turf per hour, the fraction of residue removed by saliva, the frequency of object-to-mouth contacts per hour, and the child PAR's body weight (USEPA, 2012l). The following equation was used to estimate the ADD:

$$ADD = \frac{OR_t * CF_3 * SAM_O * ET * N_{Rep} * (1 - (1 - SE)^{(EV_{OtM}/N_{Rep})})}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
OR_t = Residue available on object (μg/cm^2)
CF_3 = Weight unit conversion factor (mg/ug)
SAM_O = Object surface area mouthed per event (cm^2/event)
ET = Exposure time (hours/day)
N_{Rep} = Number of replenishment intervals per hour (intervals/hour)
SE = Extraction by saliva
EV_{OtM} = Frequency of OtM events per hour (events/hour)
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute/subchronic object-to-mouth ingestion of turf residues is given Table 11.

Table 11: Exposure Factors Used in Estimating Acute/Subchronic Object-to-Mouth Ingestion of Turf Residue

Application	Receptor	ILS	EV_{OtM} (events/hr)[1]	BW (kg)[1,2]	F_O[1]	WRF	DtO	SAM_O (cm^2/event)[1]	ET (hrs/day)[1]	N_{Rep} (intervals/hr)[1]	SE[1]
Foliar	0-<2 PAR	1-<2 years	8.8	11.4	0.01	0	0.2	10	1.5	4	0.48
	2-<16 PAR	2-<3 years	8.1	13.8							
Turf	0-<2 PAR	1-<2 years	8.8	11.4	0.01	0.66	1	10	1.5	4	0.48
	2-<16 PAR	2-<3 years	8.1	13.8							

1. Mean value from SOP (USEPA, 2012l)
2. EFH (USEPA, 2011p)

Pica and Incidental Ingestion of Soil

Both the 0-<2 years old and 2-<16 years old child PARs were assumed to be exposed to chlorantraniliprole through ingestion of treated soils underneath garden plants or bare spots on lawns. The two child PARs were assumed to exhibit soil pica behavior, which is the recurrent ingestion of unusually high amounts of soil of between 1,000 – 5,000 mg/day (OEHHA, 2012d). USEPA's EFH (USEPA, 2011p) states, "soil-pica should not be limited to intentional soil ingestion, primarily because children can consume large amounts of soil from their typical behaviors and because differentiating intentional and unintentional behavior in young children is difficult." The soil pica soil ingestion rate is based on a total mg soil per day, and accounts for both intentional and incidental soil ingestion (OEHHA, 2012d). Due to the higher likelihood of children to consume soil, estimations of soil ingestion of the two child PARs were considered health protective of the adult PAR.

Methods and exposure factors from the USEPA's RAGS (USEPA, 1989e, USEPA, 2014d), USEPA EFH (USEPA, 2011p), OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (Hot Spots) (OEHHA, 2012d), and Agency for Toxic Substances and Disease Registry Soil-Pica Workshop (ATSDR, 2001a) were used in this assessment. Exposure factors for a 1-<2 years old and a 2-<3 years old were selected to represent the 0-<2 year-old child and 2-<16 year-old child PARs, respectively.

To estimate the ADD, the peak concentration of chlorantraniliprole residue estimated to be in soil was multiplied by a soil ingestion rate, the fraction of soil ingested that had been treated, and then divided by the child's body weight. A soil ingestion rate of 5 g soil/day was selected from Agency for Toxic Substances and Disease Registry Soil-Pica Workshop (ATSDR, 2001a), and the fraction of soil ingested from a treated site was assumed to be 100%. The following equation was used to estimate the ADD:

$$ADD = \frac{EEC * CF * IR_s * FI}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
EEC = Estimated environmental concentration (mg/kg)
CF = Conversion factor (kg/mg)
IR_s = Soil ingestion rate (mg/day)
FI = Fraction ingested
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute/subchronic pica and incidental soil ingestion is given in Table 12.

Table 12: Exposure Factors Used in Estimating Acute/Subchronic Pica and Incidental Soil Ingestion

Receptor	ILS	EEC (mg/kg)	IR_s (mg/day)[1]	FI[2]	BW (kg)[3]
0-<2 PAR	1-<2 years	Refer to Section 7.2	5,000	1	11.4
2-<16 PAR	2-<3 years				13.8

1. Suggested ingestion rate in preschool children with soil-pica by ATSDR (ATSDR, 2001a)
2. Professional judgment
3. EFH (USEPA, 2011p)

Dermal Exposure to Residues in Soil

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and the adult PAR were assumed to be dermally exposed to chlorantraniliprole residues in soil in gardens or bare spots on lawns. Methods and exposure factors from the USEPA's RAGS (USEPA, 2014d), USEPA EFH (USEPA, 2011p), and USEPA's SOP (USEPA, 2012l) were used in this assessment. Exposure factors for a 1-<2 year-old and a 2-<3 year-old were selected to represent the 0-<2 year-old child and 2-<16 year-old child PARs, respectively. For certain exposure factors, data were not available for the 2-<3 year-old lifestage index. In those instances, values from other lifestages were selected as surrogates and are presented in Table 13.

To estimate the ADD, the peak concentration of chlorantraniliprole residue estimated to be in soil, as described in section 5.2.1, was multiplied by the resident's skin surface area that typically contacts soil, a soil-to-skin adherence factor, the number of times the resident is expected to come in contact with treated soil per day, a dermal absorption factor, and divided by the resident's body weight. A surface area of 6,032 cm^2/event was selected for an adult PAR (USEPA, 2012l), 2373 cm^2/event for a 2-<16 year-old child PAR (USEPA, 2012l), and 610 cm^2/event for a 0-<2 year-old child PAR, based on the 95th percentile for total body surface area of a 1-<2 year-old child (USEPA, 2011p). The soil adherence factor used was 0.07 mg/cm^2 for an adult PAR and 0.2 mg/cm^2 for both child PARs (USEPA, 2012l). The adult and both child PARs were assumed to contact soil 71 times per hour, based on the 90th percentile soil contact rate of both hands of a child age 1 to 5 years old (USEPA, 2011p). The adult PAR was assumed to spend 2.2 hours per day outside in treated areas and the two child PARs were assumed to spend 1.1 hours per day outside in treated areas, based on USEPA's SOP guidance on activities in gardens (USEPA, 2012l). The following equation was used to estimate the ADD:

$$ADD = \frac{EEC * CF * SA * AF * ET * CR * DAF}{BW}$$

Where:

ADD = Average daily dose (mg/kg-day)
EEC = Estimated environmental concentration (mg/kg)
CF = Conversion factor (kg/mg)
SA = Surface area exposed per event (cm^2/event)
AF = Soil adherence factor (mg/cm^2)
ET = Exposure time (hours/day)
CR = Contact rate (events/hour)
DAF = Dermal absorption factor
BW = Body weight (kg)

A summary of the exposure factors used in estimating acute dermal exposure to residues in soil is given in Table 13.

Table 13: Exposure Factors Used in Estimating Acute Dermal Exposure to Residues in Soil

Receptor	ILS	EEC (mg/kg)	SA (cm^2/event)	AF (mg/cm^2)	ET (hours/day)	CR (events/hour)	DAF	BW (kg)
0-<2 PAR	1<2 years	Refer to Section 7.2	610[1]	0.2[4]	1.1[6]	71[8]	1	11.4
2-<16 PAR	2<3 years		2,373[2]					13.8
Adult PAR	Adult		6,032[3]	0.07[5]	2.2[7]			80

1. 95th percentile from EFH (USEPA, 2011p)
2. Weighed average for a 0-<6 year-old (USEPA, 2014d)
3. From RAGS, 2014 (USEPA, 2014d)
4. 95th percentile for 1-<6 year old (USEPA, 2004i; USEPA, 2014d)
5. 50th percentile for adult gardener (high activity level) (USEPA, 2004i)
6. Arithmetic mean for 6-<11 year-old (USEPA, 2012l)
7. USEPA, 2012l
8. 90th percentile contacts for a 1-<5 year-old (USEPA, 2011p)

5.3.2.2.2 Post-Application Resident Chronic Exposure Assessment

In estimating the chronic exposure to the PAR, an annual average daily dose (AADD) was estimated by extrapolating the resident's average daily exposure to a long-term exposure. This AADD extrapolation involves multiplying the route-specific ADD by the number of days the resident had the potential to be exposed per year and the number of years the resident was expected to be exposed and then divided by the total duration of time assessed. The duration of Proposed Program treatments at a single residence was assumed to be 5 years, which is an estimate of the longest period of yearly treatment intervals for the Proposed Program. Because the 0-<2 year-old child PAR lifestage is limited to two years, a two year exposure duration was assumed for this subgroup. The following equation was used to calculate the AADD:

$$AADD = \frac{ADD * EF * ED}{AT * CF}$$

Where:

AADD = Annual average daily dose (mg/kg-day)
ADD = Average daily dose (mg/kg-day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time (years)
CF = Conversion factor (days/year)

A summary of the exposure factors used in estimating the AADD is given in Table 14.

Table 14: Exposure Factors Used in Estimating the AADD

Receptor	EF (days/year)	ED (years)	AT (years)
0-<2 year-old child PAR	365	2	2
2-<16 year-old child PAR		5	5
Adult PAR		5	5

Dermal Exposure to Residues on Turf

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and adult PAR were assumed to be exposed to chlorantraniliprole residues from dermal contact with turf every day of the year. The AADD was estimated by considering first-order environmental degradation and the possibility of accumulation over multiple annual applications, where applicable. The AADD was extrapolated from the resident's average daily exposure to a long-term exposure. In order to complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except a 365-day average TTR was used instead of the peak concentration TTR. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year, the number of years the resident was expected to be exposed, and a DAF, then divided by the total duration of time assessed. Refer to Section 5.2 for additional details regarding estimating TTRs.

Hand-to-Mouth Ingestion of Turf Residues

The 0-<2 year-old child PAR and 2-<16 year-old child PAR were assumed to be exposed to chlorantraniliprole residues from hand-to-mouth activity every day of the year. The AADD was extrapolated from the post-application resident average daily exposure, considering first-order environmental degradation and the potential for multiple applications per year. To complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except the exposure estimated in the chronic Dermal Exposure to Residues on Turf was used instead of the acute exposure. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year and the number of years the resident was expected to be exposed, and then divided by the total duration of time assessed.

Object-to-Mouth Ingestion of Turf Residues

In evaluating the object-to-mouth incidental ingestion, the 0-<2 year-old child PAR and 2-<16 year-old child PAR were assumed to be exposed to chlorantraniliprole residues daily for the entire year. The daily exposure considered first-order environmental degradation and the potential for accumulation from multiple applications per year. The AADD was estimated by multiplying the extrapolated ADD by the number of potential exposure days and the number of years the resident was expected to be exposed, and then divided by the total duration of time assessed.

Pica and Incidental Soil Ingestion

The 0-<2 year-old child PAR and 2-<16 year-old child PAR were assumed to be exposed to chlorantraniliprole residues from ingestion of treated soil every day of the year. The AADD was estimated by considering first-order environmental degradation and the possibility of multiple applications per year. The AADD was extrapolated from the resident's average daily exposure to a long-term exposure. In order to complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except a 365-day average soil residue concentration was used instead of the peak soil residue concentration estimated for acute exposures. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year and the number of years the resident was expected to be exposed, and then divided by the total duration of time assessed. Refer to Section 5.2 for additional details regarding estimating soil residue concentrations.

Dermal Exposure to Residues in Soil

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and adult PAR were assumed to be exposed to chlorantraniliprole in soil daily for the entire year. The AADD was extrapolated from the post-application resident average-day exposure, considering first-order environmental degradation and the potential for multiple applications. In order to complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except a 365-day average soil residue concentration was used instead of the peak soil residue concentration estimated for acute/subchronic exposures. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year, the number of years the resident was expected to be exposed, and a DAF, and then divided by the total duration of time assessed. Refer to Section 5.2 for additional details regarding estimating soil residue concentrations.

Ingestion of Edible Vegetation

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and adult PAR were assumed to be exposed to chlorantraniliprole residues in edible vegetation daily for the entire year. The AADD was estimated by extrapolating the resident's average daily exposure to a long-term exposure.

Because fruit and vegetables have seasonal limits of availability, chronic exposure to residues on fruit and vegetables is not anticipated. However, to complete this extrapolation, the acute/subchronic ADD was multiplied by the number of potential exposure days and the number of years the resident was expected to be exposed, and then divided by the total duration of time assessed, and compared to the chronic NO(A)EL. This method of estimating chronic exposure to residues on edible vegetation is health-protective as it likely overestimates actual exposure. Refer to Section 5.2 for additional details regarding estimating edible vegetation residue concentrations.

Dermal Exposure to Residues on Vegetation

The 0-<2 year-old child PAR, 2-<16 year-old child PAR, and adult PAR were assumed to be exposed to chlorantraniliprole residues on vegetation daily for the entire year. The AADD was extrapolated from the post-application resident average-day exposure, considering first-order environmental degradation and the potential for multiple applications. In order to complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except a 365-day average DFR_t was used instead of the peak DFR_t residue concentration estimated for acute/subchronic exposures. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year, the number of years the resident was expected to be exposed, and a DAF, and then divided by the total duration of time assessed. Refer to Section 5.2.2 for additional details regarding the estimation of non-edible vegetation surface residue.

Hand-to-Mouth Ingestion of Vegetation Residues

The 0-<2 year-old child PAR and 2-<16 year-old child PAR were assumed to be exposed to chlorantraniliprole residues from hand-to-mouth activity every day of the year. The AADD was extrapolated from the post-application resident average daily exposure, considering first-order environmental degradation and the potential for multiple applications per year. To complete this extrapolation, an ADD was calculated in the same way as in the acute/subchronic assessment, except the exposure estimated in the chronic Dermal Exposure to Residues on Turf was used instead of the acute exposure. This ADD was then multiplied by the number of days the resident had the potential to be exposed per year and the number of years the resident was expected to be exposed, and then divided by the total duration of time assessed.

5.3.2.2.3 Post-Application Resident Cancer Exposure Assessment

Cancer exposure was not characterized in this risk assessment because chlorantraniliprole shows no evidence of carcinogenicity (USEPA, 2015a).

5.3.2.3 Downwind-Bystander

The downwind bystander (DWB) represents any adult or child that is downwind from an application site and has the potential to be exposed to off-site drift. In accordance with USEPA's *Overview of Issues Related to the Standard Operating Procedures for Residential Exposure Assessment* (USEPA, 1999f), the DWB was assumed to be 25 feet away from the application site.

Because the DWB would most likely be a resident, a 0-<2 year-old child, a 2-<16 year-old child, and a 16-<70 year-old adult were considered in the assessment (USEPA, 2005q). Off-target drift is unlikely for ground-directed applications because the spray nozzles are operated under low pressure, generally remain low to the ground, and the spray droplets are larger and less mobile than foliar applications; however, the DWB was assumed to be exposed to chlorantraniliprole off-target drift through dermal and inhalation pathways for both foliar and turf/lawn spray drench applications.

5.3.2.3.1 Downwind-Bystander Acute/Subchronic Exposure Assessment

Acute/subchronic exposure for the DWB was evaluated in the same manner as in the Statewide PEIR (CDFA, 2014a), unless described differently in this paragraph. Refer to the Statewide PEIR Appendix B Section 2.3 (CDFA, 2014a) for exposure assessment methodology. USEPA's Occupational Pesticide Handler Exposure Database (OPHED) was most recently updated in September 2015, and unit exposure values were selected from the updated version (USEPA, 2015b). Refer to Section 5.2 for the OPHED "Flagger" unit exposures used for estimating exposure to the DWB. DWB exposure was estimated identically for the three age-groups, except the body weights selected were 11.4 kg for the 0-<2 year-old child DWB (data for 1<2 year-olds), 13.8 kg for the 2-<16 year-old child DWB (data for 2<3 year-olds), and 80 kg for the adult DWB (USEPA, 2011p).

5.3.2.3.2 Downwind-Bystander Chronic Exposure Assessment

Chronic exposure for the DWB was evaluated in the same manner as in the Statewide PEIR (CDFA, 2014a) with exception to the exposure durations described in this paragraph. Refer to the Statewide PEIR Appendix B Section 2.3 (CDFA, 2014a) for exposure assessment methodology. The maximum consecutive years that Proposed Program treatments would be expected to occur at a single residence is 5 years. Therefore, the exposure durations for the adult DWB and 2-<16 year-old child DWB were assumed to be 5 years, and the exposure duration for the 0-<2 year-old child DWB was assumed to be 2 years.

5.3.2.3.3 Downwind-Bystander Cancer Exposure Assessment

Cancer exposure was not characterized in this risk assessment because chlorantraniliprole shows no evidence of carcinogenicity (USEPA, 2015a).

5.3.2.4 During and Post-Application Resident

The during-and-post-application resident (DPAR) represents a combination exposure of a resident who is downwind at the time his/her property is being treated, and who has the potential to be exposed to chlorantraniliprole residues on the treated vegetation after the application. A 0-<2 year-old child, a 2-<16 year-old child, and a 16-< 70 year-old adult were analyzed in the DPAR exposure assessment.

Appendix 2A

To estimate the DPAR's exposure, the DWB's and the PAR's exposure values were summed. For additional details about DWB and PAR exposure, refer to the Downwind-Bystander exposure assessment and the Post-Application Resident exposure assessment. Further details of methods and equations can be found in the Statewide PEIR (CDFA, 2014a) and Dashboard Database.

6 Risk Characterization

The risk characterization compared estimates of receptor-specific chlorantraniliprole exposure (i.e., ADD, AADD) to receptor-specific toxicity values (i.e., NO(A)ELs) to characterize the potential risk for each receptor (OEHHA, 2001a).

6.1 Non-Cancer Effects

The method used to quantify non-cancer risk for chlorantraniliprole is the MOE. The MOE represents how close the receptor's daily intake of chlorantraniliprole is to the chlorantraniliprole's NO(A)EL. The target MOE accounts for uncertainty in inter-species extrapolation and intra-species variation through the use of two 10x safety factors for a total of 100 target MOE. Thus, calculated MOEs for the receptor's exposures greater than 100 are typically not considered to be of concern (USEPA 2007k). Consistent with recent methodology used to assess CDFA programs (OEHHA, 2016a) a more conservative and health protective target MOE of 300 was used to evaluate chlorantraniliprole risk for all routes of exposure. It should be noted that MOEs are not probabilistic statements of risk.

The generic formula for estimating a MOE is:

MOE = Toxicity (mg/kg-day) / ADD (mg/kg-day)

Where:

MOE = Margin of Exposure (unitless)

ADD = Average Daily Dose

In situations where multiple pathways are present or multiple applications are made on the same day, multiple exposures occur. A MOE was estimated for chlorantraniliprole for each individual exposure route and the MOEs were summed regardless of mode of action or target organs and systems in order to conservatively estimate the hazard that may be associated with the combined exposure. This methodology is consistent with the approaches described in the *USEPA Risk Assessment Guide to Superfunds (RAGS*) and *USEPA General Principles for Performing Aggregate Exposure and Risk Assessment* which provides guidance on assessing aggregate chemical risk and aggregate exposure pathway risk (USEPA, 2001e; USEPA, 2004i). Consistent with the evaluation of individual MOEs in this HHRA, summed MOEs greater than 300 are not considered to be of concern (USEPA 2007k, OEHHA 2016a)

The generic formula for summing MOEs is:

$$MOE_{total} = 1/((1/MOE_1)+(1/MOE_2)+\ldots+(1/MOE_n))$$

Where:

MOE = Margin of Exposure (unitless)

To estimate the total risk associated with chlorantrailiprole exposure in combination scenarios, i.e., PD/EP-E-09-10a and PD/EP-E-09-10b, this HHRA estimated MOEs for individual application scenarios to Acelepryn® and summed these MOEs.

6.2 Cancer Effects

Cancer risk is not estimated in this HHRA because there is no evidence suggesting chlorantraniliprole is carcinogenic (USEPA, 2015a).

6.3 Numeric Data Presentation

Some numeric data presented in the risk characterization section were very large numbers. In order to present these numbers in an easily readable format, scientific notation is used. For example, the value of 1,290,000 is expressed as 1.29E+06. Note that the "E" represents "exponent" or the number 10 raised to a power. The positive ("+") sign following the "E" indicates the number of places the decimal point was moved to the left from the original number.

7 Risk Assessment Results

The following sections present the HHRA results for the Proposed Program. Application scenarios are first summarized, followed by a presentation of the CSM, estimated environmental concentrations, risk results (i.e., calculated MOEs), an uncertainty analysis, and conclusions.

Acelepryn® applications were categorized into separate application scenarios and given a distinct application scenario identification number (Application Scenario ID). Each Application Scenario ID represents a unique combination of application method, application rate, number of applications, application interval, application area, and environmental setting.

The estimated environmental concentrations (EECs) of chlorantraniliprole resulting from these application scenarios are available in Section 7.2. Note that the estimated acute/subchronic environmental concentrations account for the possibility of multiple applications and account for the degradation and dissipation properties of chlorantraniliprole. Degradation and dissipation properties accounted for include, but are not limited to, soil microbial metabolism, photodegradation, and plant metabolism.

Risk results, expressed as MOEs, are presented in Section 7.3.

7.1 Application Scenarios

Acelepryn® application scenarios were based on descriptions provided by CDFA staff using the PMDS and RPA. 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 five application scenarios for the Proposed Program are summarized in Table 15. These five scenarios are comprised of three base scenarios (PD/EP-E-09, PD/EP-E-10a, PD/EP-E-10b) and two composite scenarios (PD/EP-E-09-10a and PD/EP-E-09-10b). The two composite scenarios represent situations in which receptors may be exposed simultaneously through the foliar application made for PD/EP-E-09 and either the turf spray drench applications made for PD/EP-E-10a or PD/EP-E-10b, respectively.

Appendix 2A

Table 15: Application Scenarios for Japanese Beetle Control Activities

Application Scenario ID	Product	Application Method*	Setting	Adjuvant	Application Rate (oz/100 gal)	Active Ingredient Application Rate (lb active ingredient/ acre)	Application Area (acres)	Area Treated per Day	Applications/ year
PD/EP-E-09	Acelepryn®	Mechanically pressurized sprayer, hand pump sprayers, or backpack sprayers	Residential	N/A	8	0.136	640	1.5 acres/ day	4
PD/EP-E-10a	Acelepryn®	Mechanically pressurized sprayer, hand pump sprayers, or backpack sprayers	Residential	N/A	16	0.273	640	20.000 sq. ft/day	1
PD/EP-E-10b	Acelepryn®	Boom sprayer	Residential	N/A	16	1.273	640	18 acres/ day	1
PD/EP-E-09-10a	Acelepryn®	See individual scenarios	Residential	N/A	See individual scenarios	See individual scenarios	See individual scenarios	See individual scenarios	See individual scenarios
PD/EP-E-09-10b	Acelepryn®	See individual scenarios	Residential	N/A	See individual scenarios	See individual scenarios	See individual scenarios	See individual scenarios	See individual scenarios

*In place of a backpack sprayer, mechanically-pressurized sprayer or hand pump sprayer may be used for ground directed applications. As the USEPA OPHED unit exposure for backpack sprayer is higher than hand pump or mechanically-pressurized sprayer, baseline risk was evaluated using USEPA OPHED data for backpack sprayer in order to yield health protective risk estimates for scenarios where this substitution could occur (i.e., where backpack sprayer is listed).
N/A – Not applicable; formulation does not contain an adjuvant.

For all applications, exposure was evaluated by assuming application to the entire treatment area would be completed in a single day. In situations where applications may be made exclusively to just turf or select ground cover, and not to the whole residential area (i.e., the entire treatment area), this method is health protective because the modeled area treated would be substantially larger than the actual area treated.

7.2 Estimated Environmental Concentrations and Unit Exposure Values

Table 16 through Table 27 present the estimated environmental concentrations and unit exposure values used to estimate risk for the Proposed Program. For composite scenarios PD/EP-E-09-10a and PDEP-E-09-10b, please see estimated environmental concentrations and unit exposures for the individual scenarios.

Table 16: PD/EP-E-09 Chlorantraniliprole Concentrations on Foliage, Turf and in Edible Vegetation

Acute/Subchronic			Chronic		
Dislodgeable Foliar Residue (µg/cm² veg)	Transferable Turf Residue (µg/cm² turf)	Edible Vegetation Residue (mg/kg veg)	Dislodgeable Foliar Residue (µg/cm² veg)	Transferable Turf Residue (µg/cm² turf)	Edible Vegetation Residue (mg/kg veg)
4.82E-01	4.82E-03	6.51E-01	7.48E-02	7.48E-04	6.51E-01

Table 17: PD/EP-E-10a Chlorantraniliprole Concentrations on Foliage, Turf, and in Edible Vegetation

Acute/Subchronic			Chronic		
Dislodgeable Foliar Residue (µg/cm² veg)	Transferable Turf Residue (µg/cm² turf)	Edible Vegetation Residue (mg/kg veg)	Dislodgeable Foliar Residue (µg/cm² veg)	Transferable Turf Residue (µg/cm² turf)	Edible Vegetation Residue (mg/kg veg)
N/A	1.00E-02	8.90E-04	N/A	6.19E-04	8.90E-04

Appendix 2A

Table 18: PD/EP-E-10b Chlorantraniliprole Concentrations on Foliage, Turf, and in Edible Vegetation

Acute/Subchronic			Chronic		
Dislodgeable Foliar Residue (μg/cm^2 veg)	Transferable Turf Residue (μg/cm^2 turf)	Edible Vegetation Residue (mg/kg veg)	Dislodgeable Foliar Residue (μg/cm^2 veg)	Transferable Turf Residue (μg/cm^2 turf)	Edible Vegetation Residue (mg/kg veg)
N/A	1.00E-02	8.90E-04	N/A	6.19E-04	8.90E-04

Table 19: PD/EP-E-09 Chlorantraniliprole Concentrations in Soil

Acute/Subchronic	Chronic
Soil Residue Concentration (mg/kg soil)	Soil Residue Concentration (mg/kg soil)
5.22E-02	4.08E-02

Table 20: PD/EP-E-10a Chlorantraniliprole Concentrations in Soil

Acute/Subchronic	Chronic
Soil Residue Concentration (mg/kg soil)	Soil Residue Concentration (mg/kg soil)
1.36E-01	1.10E-01

Table 21: PD/EP-E-10b Chlorantraniliprole Concentrations in Soil

Acute/Subchronic	Chronic
Soil Residue Concentration (mg/kg soil)	Soil Residue Concentration (mg/kg soil)
1.36E-01	1.10E-01

Appendix 2A

Table 22: PD/EP-E-09 Spray Drift Unit Exposure Values

Flagger Dermal (µg/lb ai)	Flagger Inhalation (µg/lb ai)	AgDRIFT Percent Deposition
1.10E+01	3.50E-01	0.83%

Table 23: PD/EP-E-10a Spray Drift Unit Exposure Values

Flagger Dermal (µg/lb ai)	Flagger Inhalation (µg/lb ai)	AgDRIFT Percent Deposition
1.10E+01	3.50E-01	0.83%

Table 24: PD/EP-E-10b Spray Drift Unit Exposure Values

Flagger Dermal (µg/lb ai)	Flagger Inhalation (µg/lb ai)	AgDRIFT Percent Deposition
1.10E+01	3.50E-01	0.83%

Table 25: PD/EP-E-09 OPHED Unit Exposure Values

Mixer-Loader-Applicator (MLA)		Mixer-Loader (ML)		Applicator (A)	
Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)
3.05E+04	6.91E+01	See MLA	See MLA	See MLA	See MLA

Table 26: PD/EP-E-10a OPHED Unit Exposure Values

Mixer-Loader-Applicator (MLA)		Mixer-Loader (ML)		Applicator (A)	
Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)
8.26E+03	2.58E+00	See MLA	See MLA	See MLA	See MLA

Table 27: PD/EP-E-10b OPHED Unit Exposure Values

Mixer-Loader-Applicator (MLA)		Mixer-Loader (ML)		Applicator (A)	
Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)	Dermal (µg/lb ai)	Inhalation (µg/lb ai)
See ML, A	See ML, A	3.76E+01	2.19E-01	1.61E+01	3.40E-01

7.3 Risk Results

Table 28 through Table 63 present the calculated MOEs for the Proposed Program. Note that the target MOE value used for this HHRA is 300, which means that an exposure with an MOE of 300 or greater indicates that adverse impact to human health is not anticipated. For the scenarios evaluated in the HHRA, MOE values ranged from approximately 4,800 to greater than 12,000,000,000,000. Thus, exposure to chlorantraniliprole during the Proposed Program is unlikely to result in adverse impacts to human health. A “-“ in the MOE tables indicates that receptor and exposure pathway were not quantitated as the route of exposure was not applicable.

The magnitude of an MOE is indicative of the general safety of exposure, with larger MOEs generally indicating lesser relative potential risk. Comparatively large MOEs should not, however, be interpreted as encouraging a receptor to unnecessarily come into contact with environmental media containing chlorantraniliprole.

Table 28: PD/EP-E-9 Acute/Subchronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.29E+04	8.19E+06	1.28E+04	See MLA	See MLA	See MLA	See MLA	See MLA	See MLA

Table 29: PD/EP-E-09 Chronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.85E+05	8.18E+07	1.85E+05	See MLA	See MLA	See MLA	See MLA	See MLA	See MLA

Appendix 2A

Table 30: PD/EP-E-10a Acute/Subchronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
7.73E+04	3.57E+08	7.73E+04	See MLA	See MLA	See MLA	See MLA	See MLA	See MLA

Table 31: PD/EP-E-10a Chronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
4.46E+06	1.43E+10	4.46E+06	See MLA	See MLA	See MLA	See MLA	See MLA	See MLA

Table 32: PD/EP-E-10b Acute/Subchronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
3.03E+05	4.20E+07	3.01E+05	4.33E+05	1.07E+08	4.31E+05	1.01E+06	6.91E+07	9.97E+05

Table 33: PD/EP-E-10b Chronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.75E+07	1.68E+09	1.73E+07	2.50E+07	4.29E+09	2.48E+07	1.01E+06	6.91E+07	9.97E+05

Appendix 2A

Table 34: PD/EP-E-9-10a Acute/Subchronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.10E+04	8.01E+06	1.10E+04	See MLA	See MLA	See ML, A	See MLA	See MLA	See MLA

Table 35: PD/EP-E-9-10a Chronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.78E+05	8.14E+07	1.78E+05	See MLA	See MLA	See ML, A	See MLA	See MLA	See ML, A

Table 36: PD/EP-E-9-10b Acute/Subchronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.10E+04	8.01E+06	1.10E+04	See MLA	See MLA	See ML, A	See MLA	See MLA	See MLA

Table 37: PD/EP-E-9-10b Chronic MOEs for MLA

Mixer-Loader-Applicator (MLA)			Mixer-Loader (ML)			Applicator (A)		
Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE	Dermal MOE	Inhalation MOE	Summed MOE
1.83E+05	7.80E+07	1.83E+05	See MLA	See MLA	See ML, A	See MLA	See MLA	See ML, A

Appendix 2A

Table 38: PD/EP-E-09 Acute/Subchronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	6.12E+08	2.78E+10	5.99E+08
Downwind Bystander Child 2-<16	7.41E+08	3.36E+10	7.25E+08
Downwind Bystander Adult 16-70	4.30E+09	1.95E+11	4.20E+09

Table 39: PD/EP-E-09 Chronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	8.82E+09	2.77E+11	8.55E+09
Downwind Bystander Child 2-<16	1.07E+10	3.36E+11	1.04E+10
Downwind Bystander Adult 16-70	6.19E+10	1.95E+12	6.00E+10

Table 40: PD/EP-E-10a Acute/Subchronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	9.96E+08	4.52E+10	9.75E+08
Downwind Bystander Child 2-<16	1.21E+09	5.47E+10	1.18E+09
Downwind Bystander Adult 16-70	6.99E+09	3.17E+11	6.84E+09

Appendix 2A

Table 41: PD/EP-E-10a Chronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	5.75E+10	1.81E+12	5.57E+10
Downwind Bystander Child 2-<16	6.96E+10	2.19E+12	6.74E+10
Downwind Bystander Adult 16-70	4.03E+11	1.27E+13	3.91E+11

Table 42: PD/EP-E-10b Acute/Subchronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	2.54E+07	1.15E+09	2.49E+07
Downwind Bystander Child 2-<16	3.08E+07	1.39E+09	3.01E+07
Downwind Bystander Adult 16-70	1.78E+08	8.09E+09	1.74E+08

Table 43: PD/EP-E-10b Chronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	1.47E+09	4.61E+10	1.42E+09
Downwind Bystander Child 2-<16	1.77E+09	5.58E+10	1.72E+09
Downwind Bystander Adult 16-70	1.03E+10	3.23E+11	9.97E+09

Appendix 2A

Table 44: PD/EP-E-09-10a Acute/Subchronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	3.79E+08	1.72E+10	3.71E+08
Downwind Bystander Child 2-<16	4.59E+08	2.08E+10	4.49E+08
Downwind Bystander Adult 16-70	2.66E+09	1.21E+11	2.60E+09

Table 45: PD/EP-E-09-10a Chronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	7.65E+09	2.40E+11	7.41E+09
Downwind Bystander Child 2-<16	9.26E+09	2.91E+11	8.97E+09
Downwind Bystander Adult 16-70	5.37E+10	1.69E+12	5.20E+10

Table 46: PD/EP-E-09-10b Acute/Subchronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	2.44E+07	1.11E+09	2.39E+07
Downwind Bystander Child 2-<16	2.95E+07	1.34E+09	2.89E+07
Downwind Bystander Adult 16-70	1.71E+08	7.76E+09	1.68E+08

Appendix 2A

Table 47: PD/EP-E-09-10b Chronic MOEs for DWB

Receptor	Dermal MOE	Inhalation MOE	Total MOE
Downwind Bystander Child 0-<2	1.26E+09	3.95E+10	1.22E+09
Downwind Bystander Child 2-<16	1.52E+09	4.78E+10	1.47E+09
Downwind Bystander Adult 16-70	8.82E+09	2.77E+11	8.55E+09

Table 48: PD/EP-E-09 Acute/Subchronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	3.22E+04	2.26E+06	7.46E+07	6.30E+07	2.29E+07	2.55E+05	9.48E+03	6.67E+05	7.02E+03
Post-Application Resident Child 2-<16	3.41E+04	3.86E+06	9.38E+07	7.63E+07	7.13E+06	5.41E+05	1.31E+04	6.41E+05	9.14E+03
Post-Application Resident Adult 16-70	6.15E+04	-	-	-	2.32E+07	8.21E+05	8.98E+03	-	7.76E+03

Appendix 2A

Table 49: PD/EP-E-09 Chronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	3.28E+04	1.60E+06	5.26E+07	8.84E+06	4.64E+06	2.79E+04	9.66E+03	4.71E+05	5.78E+03
Post-Application Resident Child 2-<16	3.47E+04	2.73E+06	6.62E+07	1.07E+07	1.44E+06	5.92E+04	1.34E+04	4.53E+05	8.07E+03
Post-Application Resident Adult 16-70	6.26E+04	-	-	-	4.70E+06	8.99E+04	9.15E+03	-	7.32E+03

Table 50: PD/EP-E-10a, PD/EP-E-10b Acute/Subchronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	1.55E+04	1.09E+06	3.55E+07	2.42E+07	8.80E+06	1.86E+08	-	-	1.52E+04
Post-Application Resident Child 2-<16	1.64E+04	1.86E+06	4.47E+07	2.93E+07	2.74E+06	3.95E+08	-	-	1.62E+04
Post-Application Resident Adult 16-70	2.96E+04	-	-	-	8.92E+06	6.00E+08	-	-	2.95E+04

Appendix 2A

Table 51: PD/EP-E-10a, PD/EP-E-10b Chronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	3.96E+04	1.93E+06	6.29E+07	3.27E+06	1.72E+06	2.04E+07	-	-	3.74E+04
Post-Application Resident Child 2-<16	4.19E+04	3.29E+06	7.92E+07	3.96E+06	5.34E+05	4.33E+07	-	-	3.80E+04
Post-Application Resident Adult 16-70	7.56E+04	-	-	-	1.74E+06	6.57E+07	-	-	7.24E+04

Table 52: PD/EP-E-09-10a and PDEP/E-09-10b Acute/Subchronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	1.05E+04	7.36E+05	2.41E+07	1.75E+07	6.36E+06	2.54E+05	-	-	4.80E+03
Post-Application Resident Child 2-<16	1.11E+04	1.25E+06	3.03E+07	2.12E+07	1.98E+06	5.40E+05	-	-	5.84E+03
Post-Application Resident Adult 16-70	2.00E+04	-	-	-	6.45E+06	8.20E+05	-	-	6.14E+03

Table 53: PD/EP-E-09-10a and PDEP/E-09-10b Chronic MOEs for PAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Total MOE
Post-Application Resident Child 0-<2	1.79E+04	8.75E+05	2.87E+07	2.39E+06	1.25E+06	2.79E+04			5.01E+03
Post-Application Resident Child 2-<16	1.90E+04	1.49E+06	3.61E+07	2.89E+06	3.90E+05	5.91E+04			6.66E+03
Post-Application Resident Adult 16-70	3.43E+04				1.27E+06	8.98E+04			6.65E+03

Table 54: PD/EP-E-09 Acute/Subchronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	3.22E+04	2.26E+06	7.46E+07	6.30E+07	2.29E+07	2.55E+05	9.48E+03	6.67E+05	6.12E+08	2.78E+10	7.02E+03
During & Post-Application Resident Child 2-<16	3.41E+04	3.86E+06	9.38E+07	7.63E+07	7.13E+06	5.41E+05	1.31E+04	6.41E+05	7.41E+08	3.36E+10	9.14E+03
During & Post-Application Resident Adult 16-70	6.15E+04	-	-	-	2.32E+07	8.21E+05	8.98E+03	-	4.30E+09	1.95E+11	7.76E+03

Appendix 2A

Table 55: PD/EP-E-09 Chronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	3.28E+04	1.60E+06	5.26E+07	8.84E+06	4.64E+06	2.79E+04	9.66E+03	4.71E+05	8.82E+09	2.77E+11	5.78E+03
During & Post-Application Resident Child 2-<16	3.47E+04	2.73E+06	6.62E+07	1.07E+07	1.44E+06	5.92E+04	1.34E+04	4.53E+05	1.07E+10	3.36E+11	8.07E+03
During & Post-Application Resident Adult 16-70	6.26E+04	-	-	-	4.70E+06	8.99E+04	9.15E+03	-	6.19E+10	1.95E+12	7.32E+03

Table 56: PD/EP-E-10a Acute/Subchronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.55E+04	1.09E+06	3.55E+07	2.42E+07	8.80E+06	1.86E+08	-	-	9.96E+08	4.52E+10	1.52E+04
During & Post-Application Resident Child 2-<16	1.64E+04	1.86E+06	4.47E+07	2.93E+07	2.74E+06	3.95E+08	-	-	1.21E+09	5.47E+10	1.62E+04
During & Post-Application Resident Adult 16-70	2.96E+04	-	-	-	8.92E+06	6.00E+08	-	-	6.99E+09	3.17E+11	2.95E+04

Appendix 2A

Table 57: PD/EP-E-10a Chronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	3.96E+04	1.93E+06	6.29E+07	3.27E+06	1.72E+06	2.04E+07	-	-	5.75E+10	1.81E+12	3.74E+04
During & Post-Application Resident Child 2-<16	4.19E+04	3.29E+06	7.92E+07	3.96E+06	5.34E+05	4.33E+07	-	-	6.96E+10	2.19E+12	3.80E+04
During & Post-Application Resident Adult 16-70	7.56E+04	-	-	-	1.74E+06	6.57E+07	-	-	4.03E+11	1.27E+13	7.24E+04

Table 58: PD/EP-E-10b Acute/Subchronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.55E+04	1.09E+06	3.55E+07	2.42E+07	8.80E+06	1.86E+08	-	-	2.54E+07	1.15E+09	1.52E+04
During & Post-Application Resident Child 2-<16	1.64E+04	1.86E+06	4.47E+07	2.93E+07	2.74E+06	3.95E+08	-	-	3.08E+07	1.39E+09	1.61E+04
During & Post-Application Resident Adult 16-70	2.96E+04	-	-	-	8.92E+06	6.00E+08	-	-	1.78E+08	8.09E+09	2.95E+04

Appendix 2A

Table 59: PD/EP-E-10b Chronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	3.96E+04	1.93E+06	6.29E+07	3.27E+06	1.72E+06	2.04E+07	-	-	1.47E+09	4.61E+10	3.74E+04
During & Post-Application Resident Child 2-<16	4.19E+04	3.29E+06	7.92E+07	3.96E+06	5.34E+05	4.33E+07	-	-	1.77E+09	5.58E+10	3.80E+04
During & Post-Application Resident Adult 16-70	7.56E+04	-	-	-	1.74E+06	6.57E+07	-	-	1.03E+10	3.23E+11	7.24E+04

Table 60: PD/EP-E-09-10a Acute/Subchronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.05E+04	7.36E+05	2.41E+07	1.75E+07	6.36E+06	2.54E+05	9.48E+03	6.67E+05	3.79E+08	1.72E+10	4.80E+03
During & Post-Application Resident Child 2-<16	1.11E+04	1.25E+06	3.03E+07	2.12E+07	1.98E+06	5.40E+05	1.31E+04	6.41E+05	4.59E+08	2.08E+10	5.84E+03
During & Post-Application Resident Adult 16-70	2.00E+04	-	-	-	6.45E+06	8.20E+05	8.98E+03	-	2.66E+09	1.21E+11	6.14E+03

Appendix 2A

Table 61: PD/EP-E-09 and PD/EP-E-10a Chronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.79E+04	8.75E+05	2.87E+07	2.39E+06	1.25E+06	2.79E+04	9.66E+03	4.71E+05	7.65E+09	2.40E+11	5.01E+03
During & Post-Application Resident Child 2-<16	1.90E+04	1.49E+06	3.61E+07	2.89E+06	3.90E+05	5.91E+04	1.34E+04	4.53E+05	9.26E+09	2.91E+11	6.66E+03
During & Post-Application Resident Adult 16-70	3.43E+04	-	-	-	1.27E+06	8.98E+04	9.15E+03	-	5.37E+10	1.69E+12	6.65E+03

Table 62: PD/EP-E-09 and PD/EP-E-10b Acute/Subchronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.05E+04	7.36E+05	2.41E+07	1.75E+07	6.36E+06	2.54E+05	9.48E+03	6.67E+05	2.44E+07	1.11E+09	4.80E+03
During & Post-Application Resident Child 2-<16	1.11E+04	1.25E+06	3.03E+07	2.12E+07	1.98E+06	5.40E+05	1.31E+04	6.41E+05	2.95E+07	1.34E+09	5.84E+03
During & Post-Application Resident Adult 16-70	2.00E+04	-	-	-	6.45E+06	8.20E+05	8.98E+03	-	1.71E+08	7.76E+09	6.14E+03

Appendix 2A

Table 63: PD/EP-E-09 and PD/EP-E-10b Chronic MOEs for DPAR

Receptor	Turf Dermal MOE	Turf Hand-to-Mouth MOE	Turf Object-to-Mouth MOE	Soil Ingestion MOE	Soil Dermal MOE	Vegetation Ingestion MOE	Vegetation Dermal MOE	Vegetation Hand-to-Mouth MOE	Drift Dermal MOE	Inhalation MOE	Total MOE
During & Post-Application Resident Child 0-<2	1.79E+04	8.75E+05	2.87E+07	2.39E+06	1.25E+06	2.79E+04	9.66E+03	4.71E+05	1.26E+09	3.95E+10	5.01E+03
During & Post-Application Resident Child 2-<16	1.90E+04	1.49E+06	3.61E+07	2.89E+06	3.90E+05	5.91E+04	1.34E+04	4.53E+05	1.52E+09	4.78E+10	6.66E+03
During & Post-Application Resident Adult 16-70	3.43E+04	-	-	-	1.27E+06	8.98E+04	9.15E+03	-	8.82E+09	2.77E+11	6.65E+03

7.4 Uncertainty Analysis

In characterizing risks from exposure to chlorantraniliprole, it is important to address the variability and uncertainty associated with the exposure/risk estimates. The risk characterization should provide information on: (1) potential measurement errors based on the precision and accuracy of the available data, (2) variability of the input data used in the exposure/risk estimates, and (3) uncertainty that results from data gaps or the assumptions used. The risk characterization also assesses the relative importance of these components on the estimates of exposure/dose and risk.

Uncertainty may be introduced into the exposure/risk calculations at various stages of the risk assessment process. Uncertainty may occur as a result of: (1) site-specific variations of chloratraniliprole fate and transport that could impact chemical partitioning, retention, and degradation, (2) the selection of exposure scenarios and exposure factors, (3) and the uncertainties associated with chloratraniliprole toxicity data that have been extrapolated from high doses in animals to low doses in humans, and that do not account for the interactions of exposures to multiple chemical substances over a lifetime. Variability can occur as a result of variations in individual day-to-day or event-to-event exposure factors or variations among the exposed population.

The remainder of this section discusses uncertainties associated with the Exposure Assessment and the Toxicity Assessment.

7.4.1 Exposure Assessment

To address the exposure assessment uncertainties, the following assumptions were made. In some cases, as noted below, conservative assumptions likely resulted in an over-estimatation of actual risk.

7.4.1.1 Inert Ingredient Information Quality

This HHRA did not evaluate information on inert ingredients because information was not available. Therefore, the contribution to risk from inert ingredients, if any, is not known.

7.4.1.2 Model Limitations

When empirical data were not available, models are often utilized to derive environmental media concentrations and exposure values in the HHRA. To overcome the innate limitations of environmental modeling, various assumptions were made based on professional judgment. When assumptions were necessary, conservative assumptions (i.e., ones that result in the highest exposure estimate) were made. For a description of the models discussed in this section, please refer to Section 5.

Limitations of each model are presented below.

7.4.1.2.1 USEPA Occupational Pesticide Handler Exposure Data (OPHED)

OPHED required the user to select from the given combinations of application techniques, settings, and PPE. When a requested application scenario did not match any of the OPHED choices, the most suitable surrogate was chosen based on professional judgment. Most studies used to derive the OPHED unit exposures were unavailable.

7.4.1.2.2 Brigg's Equation

The Brigg's equation was used to estimate chloratraniliprole concentration in vegetation. It allows for the calculation of expected tissue concentrations due to chlorantraniliprole uptake from soil residues for plants. If the Log K_{ow} was estimated at greater than 5, the model assumed there was no chlorantraniliprole uptake from the soil, limiting the analysis to foliar residues only, if applicable. When the Log K_{ow} was estimated as negative, the TSCF is assumed to be 1.0 (Collins *et al*., 2006).

The Brigg's Equation utilizes the chemical K_{ow} and a simple soil model to estimate chlorantraniliprole concentrations transported in vegetation. Multiple K_{ow}s have been reported for chlorantraniliprole from which a mean value was calculated.

Additionally, the assumptions associated with the soil properties are based on a residential soil profile that may not reflect actual application site conditions.

7.4.1.2.3 AgDRIFT

For this HHRA, most of the default values in the AgDRIFT model were left unchanged. AgDRIFT makes assumptions for a variety of parameters associated with application methods and meteorological data that may not match site specific conditions and may lead to over- or under-estimation of actual off-site drift.

7.4.1.2.4 USEPA Standard Operating Procedures for Residential Exposure Assessments (SOP)

USEPA's Residential SOPs are more reliable for estimating acute exposure than continuous exposure. The user is limited to the application settings, exposure pathways, and activity patterns provided in the SOP so a surrogate had to be chosen if the requested application and exposure options were not available. Using conservative surrogates, such as USEPA's Exposure Factors Handbook (EFH), provided more confidence that the resulting exposure was an over-estimate compared to actual exposure.

7.4.1.2.5 USEPA Risk Assessment Guidance for Superfunds (RAGS)

RAGS methodology is most commonly used to estimate continuous exposure, but in some cases (e.g., ingestion of vegetation), it was used for acute exposure assessments due to lack of appropriate alternative methodology. Alternative methodologies that were considered but deemed less conservative or less appropriate for the specific analysis included, but were not limited to, USEPA *Standard Operating Procedures for Residential Exposure Assessments* (USEPA, 2012l) and USEPA's *Occupational Pesticide Handler Exposure Data* (USEPA, 2013b).

7.4.2 Toxicity Assessment

To address the toxicity assessment uncertainties, the following assumptions were made. In some cases, as noted below, conservative assumptions likely resulted in an over-estimate of actual risk.

7.4.2.1 Toxicological Endpoints

The toxicity assessment evaluated non-cancerous adverse effects that were derived from animal data observed in controlled experiments. Uncertainty associated with the NO(A)EL extrapolated for human exposure are addressed through use of the uncertainty factors which determine the target MOE. For this HHRA, a higher target MOE of 300, instead of the 100 used in the Statewide PEIR (CDFA, 2014a), was used to be consistent with OEHHA's recent analysis (OEHHA, 2016a). The uncertainty factors were inter-species extrapolation (10-fold) and intra-species variation (30-fold), which multiplied together result in a total target MOE of 300 for the Proposed Program. There exists uncertainty in using a "freestanding NO(A)EL" (i.e., a point of departure that has no adverse effect associated with it, but instead is the maximum dose tested without adverse effects). There also exists uncertainty in the extrapolation of an oral endpoint to dermal and inhalation exposure pathways. Differences in metabolism and susceptibility at different sites influence the dose of a chemical that interacts at a receptor level, as well as whether the adverse effects are local or systemic.

7.4.2.2 Endocrine Disruptors

Endocrine disruptors are chemicals or mixtures of chemicals that may interfere with the body's endocrine system and produce developmental, reproductive, neurological and immune effects in both humans and wildlife (NIEHS, 2013). Although endocrine disruptors are generally considered to have the potential to cause adverse effects, considerable uncertainty exists regarding the relationship between endocrine disruptor exposure and adverse health outcomes. In many cases, only screening level data are available indicating the potential for a chemical to interact with the endocrine system in a way that may produce an adverse effect (USEPA, 2011v). No data were available to indicate that chlorantraniliprole is an endocrine disruptor. In general, these and other forms of endocrine disruptor data are not sufficient for conducting a risk assessment. As a result, endocrine disruption was not explicitly assessed in this HHRA.

7.4.2.3 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, 2013). Uncertainty exists as to whether any of the chemicals analyzed in this HHRA produce synergistic effects. Although methodologies were available for assessing synergism, no usable endpoints were available in the literature to evaluate synergistic relationships of chlorantraniliprole and other chemicals. Therefore, synergistic effects could not be evaluated in this risk assessment.

7.5 Conclusions

This HHRA was conducted in order to assess the potential health risk to humans from implementation of Proposed Program. The HHRA was conducted using procedures and methodologies commonly accepted and used by government agencies such as USEPA, DPR, OEHHA and CDPH as well as the wider risk assessment community. The HHRA relied upon the four stage process for risk assessments: hazard identification, toxicity dose response assessment, exposure assessment, and risk characterization. In the hazard identification phase, CDFA and its risk assessment team consulted with DPR, CDPH and OEHHA to determine the appropriate scenarios to assess, which models should be used to evaluate exposure, default input parameters, and appropriate toxicity effect representations. The toxicity dose-response assessment phase selected health-protective values for acute, subchronic, and chronic non-cancer health effects. Cancer slope factors (CSF) were not obtained because the available data does not indicate that chlorantraniliprole is carcinogenic. Non-cancer health effects were based on NO(A)ELs obtained from toxicity studies. In the exposure assessment phase, the ADD and AADD for potentially exposed populations were estimated using various models accounting for concentration of chlorantraniliprole in various environmental media and subsequent exposure by human receptors. The risk characterization phase provided a quantitative assessment of the potential for adverse effects to receptors.

For each of the application scenarios analyzed for the Proposed Program, the calculated MOE exceeded the target MOE value of 300. This indicates that exposure to chlorantraniliprole during the Proposed Program is unlikely to result in adverse impacts to human health.

This HHRA, along with the Statewide PEIR (CDFA, 2014a), will be used to assist CDFA in assessing potential impacts to human health. This HHRA did not identify any new significant human health impacts or any substantial increase in the severity of the significant effects identified in the PEIR. No alterations to PD/EP-E-09, PD/EP-E-10a, PD/EP-E-10b, PD/EP-E-09-10a, or PD/EP-E-09-10b that were not already indicated for other scenarios in the PEIR are recommended.

8 References

NOTE: References match those listed in the Dashboard Database. Therefore, lettering order following publication years may not always be in sequence in this report. Links to webpages and PDFs were active as of the listed access date. Access to those web resources and information presented therein are subject to change.

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Appendix 2A

Appendix A: Program Material Data Sheets (PMDS)

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

PMDS Status Summary

Prepared by
(CDFA):**L. Petro** Date: **3.3.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **3.16.16**

☒Reviewed, ☒ Revised, ☐ Approved by:
(CDFA): **L. Petro** Date: **4.8.16**

☒ Reviewed, ☒ Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **4/22/16**

☐Reviewed, ☐ Revised, ☒ Approved by:
(CDFA): **L.Petro** Date:5/3/16

☐Reviewed, ☐ Revised, ☒ Approved by:
(Blankinship):J. Sullivan Date: 5/4/16

INSTRUCTIONS:

1.) Fill in the PMDS template with the specific application scenario details.
2.) In the "Application Description" section, please provide a description of 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.) If the scenario involves fumigation, trapping, varying application intervals, or if multiple active ingredients are used, please contact Blankinship & Associates at (530) 757-0941.
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

Program Name: PD/EP-E-09

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
Acelepryn	No	Chlorantraniliprole	Beetle	Ornamental plants, shrubs and trees

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	Urban residential landscapes* See "*" definition below	Statewide

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.)
Turf, soil, organic or inorganic mulch	Foliar spray	Mechanically pressurized sprayer, Backpack or hand pump sprayer

Applications per year	Application Interval	Application Rate	Application Rate Units	Final Tank Mix Applied	Tank Spray Volume per Area Unit
Up to 4	3 weeks	8	Oz/100 gal	3	gal/1000 SF

Application Area	Application Area Units	Area Treated/Day	Area Treated/Day Units
640	acres	1.5	acres

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Application Description & Assumptions (please describe the application in as much detail as possible. Use the 2nd page if needed):

In a 200 meter radius around detections, foliar application of Acelepryn to foliage of ornamental plants and trees/landscaped areas including flowers and containerized plants. No application to edible plants, including fruit or nut trees. Application height to a maximum of 30' into tree canopy. Mitigations include; no application within 48 hrs. of predicted rain, halt to operations when wind exceeds 10 mph, buffer areas of 12 inches or protective tarp placement around food crop plants and/or immovable property items. Residents provided information & material/ post treatment precautions. Applications made under supervision of CDFA and CAC PUE. Urban residential settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business.

Follow all label requirements. Program staff will conduct a Site Assessment to verify each program area to determine if there are any specific conditions that need further evaluation.

CDFA PMDS (Add additional detail as needed below to fully describe the proposed activity):

Add text here.

- Application could be made as early as mid-May through August.
- Staff wearing PPE identical to the applicators will hold up a barrier to act as a shield to prevent drift to nontarget areas.
- Protective tarp placement around food crop plants and or immovable objects in yards.
- Treated landscape signs will be posted with a minimum of four hour re-entry period for landscape.
- Recommend no food crops be planted in areas treated with Acelepryn for one year.

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

PMDS Status Summary
Prepared by (CDFA):**L. Petro** Date: **3.3.16**
☒Reviewed, ☒ Revised, ☐ Approved by: (Blankinship): **J. Sullivan** Date: **3.11.16**
☒Reviewed, ☒ Revised, ☐ Approved by: (CDFA): **L. Petro** Date: **3.22.16**
☒ Reviewed, ☒ Revised, ☐ Approved by: (Blankinship): **J. Sullivan** Date: **4/22/16**
☒Reviewed, ☐ Revised, ☒ Approved by: (CDFA):______L. Petro___Date: 5.3.16_____
☐Reviewed, ☐ Revised, ☒ Approved by: (Blankinship):J. Sullivan Date: 5/4/16

INSTRUCTIONS:

1.) Fill in the PMDS template with the specific application scenario details.
2.) In the "Application Description" section, please provide a description of 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.) If the scenario involves fumigation, trapping, varying application intervals, or if multiple active ingredients are used, please contact Blankinship & Associates at (530) 757-0941.
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

Program Name: PD/EP-E-10

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
Acelepryn	No	Chlorantraniliprole	Beetle	Ornamental/turf/ground cover

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	Urban/residential on turf/ground* cover landscapes. See "*" definition below	Statewide

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.)
None	Spray drench	Mechanically pressurized sprayer, boom sprayer, hand pump sprayers, backpack sprayers

Applications per year	Application Interval	Application Rate	Application Rate Units	Final Tank Mix Applied	Tank Spray Volume per Area Unit
1	Annual	16	Oz/100 gal	3	gal/1000 SF

Application Area	Application Area Units	Area Treated/Day	Area Treated/Day Units
640	acres	20,000 (18)	sq. Ft with backpack (acres with boom) see attached

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Application Description & Assumptions (please describe the application in as much detail as possible. Use the 2nd page if needed):

In a 200 meter radius around detections, *ground application of Acelepryn to turf (includes lawns/golf courses), recreational areas, ornamental plants (includes flowers, containerized plants and ground cover areas, also organic or inorganic mulch and bare soil/followed by "watering in" of material through "thatch" per label. Mitigations include; no application within 48 hrs. of predicted rain, buffer areas of 12 inches maintained around food crop plants. Residents provided information & material/ post treatment precautions. Applications made under supervision of CDFA and CAC PUE. Urban residential settings include: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, and other landscaped areas. Applications may be made during off hours in school settings or business areas. Mechanically pressurized sprayer, backpack sprayer or hand pump application except sports fields or other large areas may be treated using a boom sprayer. Watering is done using similar ground spray equipment.

Follow all label requirements. Program staff will conduct a Site Assessment to verify each program area to determine if there are any specific conditions that need further evaluation.

CDFA PMDS (Add additional detail as needed below to fully describe the proposed activity):

Add text here.

- Application timing as early as mid-April through mid-May.
- Following the pesticide application, the watering in will be done at a minimum of two gallons per 1,000 square feet.
- Application areas will be 20,000 sq. ft. with a backpack sprayer made by an individual applicator; 18 acres with a boom sprayer with a single applicator.
- Staff wearing PPE identical to the applicators will hold up a barrier to act as a shield to prevent drift onto nontarget areas with residues on the barrier washed onto lawn.
- Treated landscape signs will be posted with a four hour re-entry period for landscape. Landscapes will be inspected to make sure it is dry prior to removal of signs.