



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

MEMORANDUM

DATE: September 29, 2022

SUBJECT: Proposed Revisions to the Methomyl Proposed Interim Registration Review Decision, Case Number 0028

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I. Overview

Methomyl is a carbamate insecticide, first registered in 1968. The Reregistration Eligibility Decision (RED) for methomyl was completed in 1998 and methomyl was included in the *N*-methyl carbamate (NMC) Cumulative Assessment¹ completed in 2007. Methomyl is a Group 1A insecticide and is registered for a variety of agricultural uses including field crops, vegetable crops, and orchard crops. Methomyl is also registered as a fly-bait. There are no residential uses of methomyl. All methomyl products, except the 1% active ingredient (AI) bait formulations, are classified as Restricted Use Products (RUP). On September 16, 2020, the Environmental Protection Agency (EPA or the Agency) signed the *Proposed Interim Registration Review Decision Case Numbers 0028 (methomyl) 2675 (thiodicarb)*,² henceforth referred to as the Proposed Interim Decision (PID). Here, the Agency is proposing revisions to the 2020 PID.

Under Section 7(a)(2) of the Endangered Species Act (ESA), EPA must consult with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) (together, the Services) to ensure that the use of methomyl is not likely to jeopardize the continued existence of federally listed

¹ EPA-HQ-OPP-2007-0935-0003 on www.regulations.gov

² Available on the public docket, EPA-HQ-OPP-2010-0751 (methomyl) and EPA-HQ-OPP-2009-0432 (thiodicarb), at www.regulations.gov.

species or destroy or adversely modify designated critical habitat. The Agency completed the Final National Level Listed Species Biological Evaluation³ (Final BE) for methomyl on March 31, 2021. The Final BE for methomyl identifies the federally listed species (listed species) and designated critical habitat that are likely to be adversely affected (LAA) from methomyl use. The LAA determination means that EPA reasonably expects that at least one individual animal or plant, among a variety of listed species, may be exposed to the pesticide at a sufficient level to have an adverse effect. As a result, there are often a high number of LAA determinations in a BE. An LAA determination, however, does not necessarily mean that a pesticide is putting a species in jeopardy. Because EPA made LAA determinations for some listed species, EPA initiated formal consultation with the Services. During consultation, the Services will develop Biological Opinions (BiOPs), which will include their official determinations of whether a pesticide is likely to jeopardize each relevant listed species or adversely modify its critical habitat, and include any additional mitigation measures the Services develop in coordination with EPA and stakeholders. EPA will then implement any necessary mitigation measures to protect listed species, in collaboration with pesticide registrants. At the time of publication of this memorandum, ESA consultation with the Services on methomyl is ongoing. The Agency will complete its consultation with the Services and meet its ESA obligations prior to completing the methomyl registration review.

In April 2022, EPA released a comprehensive, long-term approach to meeting its ESA obligations for pesticides *Balancing Wildlife Protections and Responsible Pesticide Use* (referred to hereafter as ESA workplan).⁴ Given EPA's large ESA workload for registration review, the Agency identified a set of pilot chemicals, including methomyl, to focus its early mitigation efforts while formal consultation with the Services is ongoing. As mentioned in the ESA workplan,⁵ EPA is working through several pilot chemicals including methomyl and identifying pilot listed species that are likely in need of mitigation for the pilot chemicals. The intent is to help stakeholders better understand how proposed mitigation for these species would allow EPA to address predicted likelihood of jeopardy to the listed species or adverse modification to their designated critical habitat for the pilot chemicals. EPA would then provide this information to the Services for their final jeopardy and adverse modification determinations at the conclusion of the ongoing formal consultation.

Using its authorities under FIFRA, and in advance of completion of consultation with the Services, EPA is proposing mitigation for three pilot listed species for methomyl. EPA is proposing that the mitigation measures for these pilot species, which are geographically-specific use directions, will be implemented through Endangered Species Protection Bulletins using EPA's Bulletins Live! Two (BLT) system.⁶ The Agency proposes that all methomyl labels (excluding the 1% AI fly bait formulations) include language instructing users to check the BLT website in order to understand listed species use restrictions that may apply to them.

With this pilot, EPA developed an approach for identifying vulnerable species where potential J/AM is expected and mitigation measures that would reduce exposure and allow the Agency to predict that use of methomyl would not have the likelihood of J/AM. In *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022), EPA describes the methods it used to identify pilot species, why a preliminary likelihood of J/AM is predicted, species-specific mitigation measures, and how these measures will allow EPA to predict there is not a likelihood of J/AM

³ *Final National Level Listed Species Biological Evaluation for Methomyl* (March 31, 2022). Available at <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

⁴ *Balancing Wildlife Protection and Responsible Pesticide Use: How EPA Will Meet its Endangered Species Act Obligations* (2022). Available at <https://www.epa.gov/endangered-species/epas-workplan-and-progress-toward-better-protections-endangered-species#workplan>

⁵ See page 48 of the workplan at <https://www.epa.gov/endangered-species/epas-workplan-and-progress-toward-better-protections-endangered-species#workplan>

⁶ <https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins>

from use of methomyl for the pilot species. Additionally, EPA provides a qualitative description of the potential impacts from these mitigation measures on users in the spatial regions where mitigations and use restrictions are proposed in *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022). Both *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats (September 29, 2022)* and *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022) are available on the public docket.⁷

In 2009, NMFS released a BiOp, titled *National Marine Fisheries Service Endangered Species Act Section 7 Consultation. Biological Opinion. Environmental Protection Agency Registration of Pesticides Containing Carbaryl, Carbofuran and Methomyl*⁸ specific to listed Pacific salmon and steelhead species for various pesticides, including methomyl. EPA has been assessing the mitigation measures outlined in this BiOp and, with this proposed revision to the PID for methomyl, EPA is proposing alternative Reasonable and Prudent Alternatives (RPAs) to those described in the 2009 NMFS BiOp in order to implement the BiOp. The Agency is proposing alternatives to the RPAs to account for updates to the nationwide label that occurred after the BiOp and for subsequent mitigation measures negotiated with registrants as part of FIFRA registration review. The proposed alternative mitigation measures to the RPAs align with NMFS' current approach to mitigation measures for reducing pesticide loading in aquatic environments, as described in the most current BiOp to the Agency.⁹ EPA has informed NMFS that it is proposing alternative RPAs for methomyl. NMFS will determine as part of the ongoing nationwide consultation for methomyl whether these measures are sufficiently protective to preclude jeopardy and adverse modification of designated critical habitat. See Appendix D for additional information on EPA's conclusions on the necessary mitigation to implement NMFS BiOp for methomyl for listed Pacific salmon and steelhead species.

In order to both fulfill the Agency's ESA workplan for improving outcomes for listed species,¹⁰ and implement the 2009 NMFS salmonid BiOp, EPA is proposing revisions to the methomyl PID to include additional mitigations measures. These additional mitigation measures fall within the following categories:

1. Proposed mitigation measures for three pilot listed species while formal ESA consultation with the Services is ongoing. The intention of these mitigation measures is to reduce exposure such that EPA could predict that there is not a likelihood of J/AM for the three pilot species.¹¹ These proposed measures are henceforth referred to as "early-ESA" mitigation measures.
2. Proposed alternatives to the RPAs in the 2009 NMFS salmonid BiOp for methomyl in order to implement the BiOp.

This document is organized into the following five sections:

- I. *Overview* summarizes updates since the PID and justification for this proposed revision to the PID.
- II. *ESA Pilot* provides an overview of the Final BE for Methomyl, describes the process by which EPA identified the pilot species for early-ESA mitigations, and describes the vulnerability of

⁷ Docket Number EPA-HQ-OPP-2010-0751 on regulations.gov

⁸ <https://media.fisheries.noaa.gov/dam-migration/63806531carbamate.pdf>

⁹ <https://www.fisheries.noaa.gov/resource/document/biological-opinion-chlorpyrifos-diazinon-and-malathion>

¹⁰ *Balancing Wildlife Protection and Responsible Pesticide Use: How EPA Will Meet its Endangered Species Act Obligations* (2022). Available at <https://www.epa.gov/endangered-species/epas-workplan-and-progress-toward-better-protections-endangered-species#workplan>

¹¹ The pilot species are identified in *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats (September 29, 2022)*.

each species and the species-specific life history characteristics that were considered during mitigation development.

- III. *NMFS Salmonid Biological Opinion* discusses the BiOp and how the Agency intends to implement it.
- IV. *Proposed Revisions to the PID and Regulatory Rationale* includes an overview of the proposed additional mitigation for both the pilot species and the alternative RPAs to implement the BiOp, and the anticipated impacts to methomyl users from the proposed early-ESA mitigations.
- V. *Next Steps and Timeline* provides information on the upcoming actions EPA will be taking after publication of this memorandum.

II. ESA Pilot

A. Summary of Findings in the Methomyl Biological Evaluation

In the 2021 Final BE for Methomyl, EPA made effects determinations (i.e., No Effect (NE), May Affect (MA) but Not Likely to Adversely Affect (NLAA) or Likely to Adversely Affect (LAA)) for 1,805 listed species (EPA included approximately 200 species that were candidate or proposed species at the time of the Final BE), and Adverse Modification determinations for 791 designated critical habitats. For each species and designated critical habitat, EPA based the effect determinations on the methodology detailed in Chapter 1 of the methomyl Final BE and the Revised Method document.¹² EPA made LAA determinations for 1,098 species and 281 designated critical habitats (approximately 61% of all species and 36% of critical habitats had LAA determinations). EPA made LAA determinations for species based on direct effects (e.g., to listed insects exposed on field or via spray drift) and indirect effects (e.g., potential effects on listed plants due to effects on insect pollinators). For those species and/or habitats identified as LAA, EPA further characterized the evidence supporting the determinations as strong, moderate, or weak.

B. Method for Early-ESA Pilot Species Identification

EPA adapted the methodology used by the FWS in their BiOp¹³ issued in February 2022 for the insecticide malathion to identify vulnerable species where J/AM is predicted from methomyl use. Malathion is an organophosphate insecticide with a similar mode of action (i.e., acetylcholinesterase inhibition) to that of methomyl. This adapted methodology is described as a preliminary J/AM predictions and analysis. Using this adapted methodology, EPA identified three vulnerable pilot species that represent sensitive taxa and various exposure pathways of methomyl from the 1,098 species and 281 designated critical habitats with LAA determinations.

The pilot species were identified based on vulnerability characteristics and overlap with methomyl use. Vulnerability characteristics included percent of range on federal lands, percent of population affected by methomyl, and the FWS species vulnerability classification (e.g., any adverse effects to the species could jeopardize the population). Additionally, the pilot species ranges exhibited at least 10% overlap with estimated methomyl use sites refined by usage data. Among species that exceeded the overlap assumption and met the vulnerability criteria, EPA selected three species that represent the taxa that are most sensitive to methomyl as pilots. The species selected are the Valley elderberry longhorn beetle (terrestrial invertebrate), the vernal pool tadpole shrimp (aquatic invertebrate), and the Central distinct population segment (DPS) of the California tiger salamander (amphibian). For more details on the methods used for pilot species identification, see *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022). For more information on potential adverse

¹² U.S. Environmental Protection Agency [USEPA]. 2020. Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides. March 2020. 59 pp.

¹³ <https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions>

effects on endangered and threatened (listed) species from labeled uses of methomyl, see the Final BE¹⁴¹⁵

C. Pilot Species Vulnerability and Characteristics

An overview of the life history characteristics of each pilot species is provided below. For more information on the vulnerability of each pilot species, the potential magnitude of effect from registered methomyl uses, the ranges and designated critical habitats of the pilot species, and the overlap of the species' ranges with methomyl use sites, see *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022).

1. Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle is a federally listed terrestrial invertebrate that feeds and reproduces on elderberry plants in riparian areas along rivers in California such as the Merced River (Merced County), the American River (Sacramento County), and Putah Creek (Yolo County) of the Central Valley of California (See **Figure 1 and Table 1, Appendix C**). Elderberry is the obligate larval host plant for the beetle, and environmental and habitat conditions that favor a robust elderberry community also benefit the beetle.¹⁶ The designated critical habitat for this species is completely encompassed within the FWS-designated range (see **Figure 1, Appendix C**). This pilot species represents a group of organisms that is sensitive to methomyl (i.e., terrestrial invertebrates) and thus may experience direct toxicological effects from exposure to methomyl via spray drift (i.e., off field). Specifically, the beetle's primary exposure pathway is from encountering spray drift on elderberry shrubs in riparian habitat adjacent to agricultural fields. It is also possible that elderberry could be found within agricultural fields, and the beetle could, therefore, be exposed to direct methomyl applications. However, it is expected that the beetle primarily occurs with the elderberry trees growing in uncultivated riparian areas, and thus most individual insects are expected to occur bordering the field and be exposed via spray drift. It is anticipated that individual beetles exposed to methomyl are more likely to experience lethal effects (i.e., mortality) than sublethal effects because exposure would result in mortality before chronic effects are realized. Adult Valley elderberry longhorn beetle are present and mating in riparian habitat from March through early June and peak populations are found from late April to mid-May. The FWS considers this species to have a high overall vulnerability.¹⁷

2. Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardii*) is a federally listed crustacean that inhabits a variety of freshwater ecosystems throughout California; however, the shrimp can be uncommon even where vernal pool habitats occur.¹⁸ This species has both an FWS-designated range and a designated critical habitat (see **Figures 2 and 3, Appendix C**). This pilot species represents a taxa that is sensitive to methomyl (aquatic invertebrate) and may be directly exposed to methomyl via spray drift and runoff to aquatic habitat (i.e., vernal pools) adjacent to the field. Methomyl is highly toxic to aquatic invertebrates on both an acute and chronic exposures basis and crustaceans were identified as the most sensitive aquatic invertebrate sub-taxon in the Final BE for methomyl. Based on the species' habitat requirements, it is not

¹⁵ Final National Level Listed Species Biological Evaluation for Methomyl. Available at

<https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

¹⁶ U.S. Fish and Wildlife Service. [USFWS]. 2019. Revised Recovery Plan for Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*).

¹⁷ <https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions>

¹⁸ U.S. Fish and Wildlife Service [USFWS]. 2005b. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.

anticipated to be located on agricultural fields, but it could reside adjacent to agricultural fields where methomyl is applied. The species is active in vernal pools from November to March. The FWS considers this species to have a high overall vulnerability.¹⁹

3. California Tiger Salamander

The California tiger salamander is a federally listed obligate-biphasic amphibian with three genetically distinct and geographically isolated Distinct Population Segments (DPSs). The Central California DPS of California tiger salamander (Central California tiger salamander) met the vulnerability criteria to be selected as a pilot species for early-ESA mitigations, although all three DPSs share similar biological needs and life history. This species has both an FWS-designated range and a designated critical habitat (see **Figures 4 and 5, Appendix C**). This pilot species represents a taxa that is sensitive to methomyl (amphibians) and may be directly exposed to methomyl via spray drift and runoff from methomyl applications as well as consumption of invertebrates (aquatic and/or terrestrial) that are exposed to methomyl. Unlike the other pilot species in which toxicity data is available for similar species, direct effects of methomyl on the California tiger salamander were established using surrogate species (fish for the aquatic-phase and birds for the terrestrial-phase), an approach previously identified and used to represent the different life-stages of amphibians. Indirect effects based on loss of prey of the California tiger salamander were established using aquatic and terrestrial invertebrates.

California tiger salamanders have both aquatic and terrestrial phases. Eggs are laid between October and May and larva develop in vernal pools or permanent ponds (i.e., stock ponds). After metamorphosis (approximately 3-6 months), the salamanders leave the waterbody and begin their terrestrial life-phase. The peak period for juveniles to leave ponds is reported to be from May to July but could occur as late as October.²⁰ While in the terrestrial life-phase, the salamanders spend most of their lives within terrestrial burrows.^{21 22} Adult salamanders only leave their burrows to partake in a mass mating migration to water bodies a few rainy nights per year (between October and May).

Because the salamander may be present on field or off field, and the range includes a variety of crop lands where broadcast methomyl applications may occur, it is possible for a terrestrial-phase California tiger salamander to be exposed to methomyl from field applications either on the field or via spray drift. However, the terrestrial phase may have a lower likelihood of exposure because this phase primarily resides within underground burrows. Aquatic-phase individuals exposed to methomyl could experience mortality (direct), sublethal (indirect) effects, as well as indirect effects from loss of prey items (aquatic invertebrates) from runoff and/or spray drift. Direct effects from methomyl to terrestrial-phase individuals are assumed to be minimal because most of the adult terrestrial-phase is spent below ground in burrows. However, indirect effects to terrestrial-phase individuals from loss of prey items (terrestrial invertebrates) is possible. The FWS considers the vulnerability of the Central California tiger salamander to be medium.²³

III. NMFS Salmonid Biological Opinion

In EPA's recent ESA workplan, the Agency described its intention to implement the terms of existing

¹⁹ <https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions>

²⁰ Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*). Available at

https://ecos.fws.gov/docs/recovery_plan/Signed%20Central%20CTS%20Recovery%20Plan.pdf

²¹ U.S. Fish and Wildlife Service. [USFWS]. 2014. California tiger salamander (*Ambystoma californiense*) 5-Year Review

²² U.S. Fish and Wildlife Service. [USFWS]. 2017. Recovery Plan for the Central California Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*).

²³ <https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions>

NMFS BiOps (see Appendix A of the workplan). In April 2009, NMFS released a partial BiOp specific to listed Pacific salmon and steelhead species for various pesticides, including methomyl²⁴. EPA is choosing to implement this BiOp as part of its registration review process. The Agency is proposing alternative Reasonable and Prudent Alternatives (RPAs) to those described in the 2009 NMFS BiOp for two reasons: 1) to account for the nationwide mitigation measures added to the methomyl labels since 2009 or already negotiated with registrants as part of FIFRA registration review (and were proposed in the 2020 PID) and 2) to align mitigation measures with NMFS' current approach for reducing pesticide loading in aquatic environments (*i.e.*, point system), as described in the most current BiOp to the Agency²⁵. See Appendix D for additional information on EPA's conclusions on the necessary mitigation to implement NMFS BiOp for listed Pacific salmon and steelhead species. For more on the proposed alternative RPAs, please see Section IV.C, Proposed Risk Mitigation and Regulatory Rationale to Implement NMFS Salmonid BiOp.

IV. Proposed Revisions to the PID and Regulatory Rationale

As stated in the ESA workplan, EPA is committed to identifying and incorporating early mitigation for vulnerable ESA species while the formal consultation process with the Services is ongoing.²⁶ Based on the findings in the final BE for methomyl²⁷ and the preliminary J/AM analysis²⁸, EPA predicts the likelihood of jeopardy for the three pilot listed species identified for early-ESA mitigation without the necessary mitigation proposed below. EPA's predictions of jeopardy will be provided to the FWS to inform the ongoing formal ESA consultation.

The Agency considered the life history and habitat of each species to develop relevant early-ESA mitigations proposed here for the three pilot species. Some measures are temporally specific, based on a species' life history. Each of the three pilot species have FWS-defined range and designated critical habitat, which enables EPA to make the mitigation measures applicable only to users within the specified geographic areas. EPA proposes to implement the early-ESA mitigation measures on Bulletins Live! Two (BLT)²⁹. Endangered Species Protection Bulletins are contained in an on-line tool that is part of EPA's Endangered Species Protection Program. Bulletins set forth geographically specific pesticide use limitations for the protection of threatened and endangered (listed) species and their designated critical habitat. Therefore, the Agency is proposing one additional label statement that will direct users to BLT to access necessary early-ESA mitigation measures. If FWS agrees with EPA's predictions, the need for these additional measures would be included in their draft BiOp.

EPA is proposing mitigations to reduce runoff and drift of methomyl near the habitats where the three listed species are or may be present. Proposed mitigations include prohibitions within their designated critical habitat as well as certain restrictions within their species range that are temporally specific application prohibitions, wind speed and/or wind direction restrictions, application buffers, rate reductions, and runoff mitigations. Species-specific mitigations and a description of how these mitigations are predicted to avoid the likelihood of J/AM is described below.

EPA qualitatively assessed the potential impacts from these mitigation measures and anticipates minimal impacts on most methomyl users in the locations where use restrictions are proposed, however some

²⁴ NMFS. 2009. *Endangered Species Act Section 7 Consultation Biological Opinion Environmental Protection Agency Registration of Pesticides Containing, Carbaryl, Carbofuran, and Methomyl*. April 20, 2009. National Marine Fisheries Service.

²⁵ <https://www.fisheries.noaa.gov/resource/document/biological-opinion-chlorpyrifos-diazinon-and-malathion>

²⁶ https://www.epa.gov/system/files/documents/2022-04/balancing-wildlife-protection-and-responsible-pesticide-use_final.pdf

²⁷ <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

²⁸ *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats (September 29, 2022)*

²⁹ <https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins>

sweet corn growers may face substantial losses in net operating revenue.³⁰

Finally, with this proposed revision to the PID, EPA is proposing mitigation measures to implement the 2009 *National Marine Fisheries Service Endangered Species Act Section 7 Consultation. Biological Opinion. Environmental Protection Agency Registration of Pesticides Containing Carbaryl, Carbofuran and Methomyl*.³¹

A. Proposed Endangered Species and Bulletins Live! Two Label Language

EPA is proposing that the following statement be added to all methomyl labels. This language will require users to access the early-ESA mitigation measures (proposed in Section IV.2-4 and Appendix B) and to confirm whether their application site is within the geographic regions where these risk-reduction measures are required. Addition of this statement to labels will help streamline implementation of any additional risk reduction measures that may be identified during the nationwide ESA consultation process.

“Endangered Species Protection Requirements: It is a Federal offense to use any pesticide in a manner that results in an unauthorized “take” (e.g., kill or otherwise harm) of an endangered species and certain threatened species, under the Endangered Species Act section 9. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. You must obtain a Bulletin no earlier than six months before using this product. To obtain Bulletins, consult <http://www.epa.gov/espp>, call 1-844-447-3813, or email ESPP@epa.gov. You must use the Bulletin valid for the month in which you will apply the product.”

Because the early-ESA mitigation measures are applicable only in particular geographic regions where listed species are present and in some cases only during certain times of the year, and because listed species are present in different areas and require different mitigations on the use of methomyl to protect them from jeopardy, a physical label that contains all the mitigation information would be difficult to use. Growers would need to identify the location of their field relative to the location of each listed species’ range and critical habitat, and then identify the mitigations with which they are required to comply. If all the restrictions were placed on the labels, it would likely be hundreds of pages long, and an applicator would have the burden of figuring out where on the label applies to them. The complexity of a paper label would likely be compounded by the addition of further mitigation for other listed species in the future. In order to simplify this process, EPA will provide information on what mitigations are required for each grower depending on the location of their field on Bulletins Live! Two (BLT). This online tool will assist growers in identifying the mitigations relevant to their particular situation instead of requiring the grower to conduct this effort themselves.

Appendix C provides guidance for methomyl users to learn if they are adjacent to or within borders of a species’ range or designated critical habitat.

B. Proposed Risk Mitigation to Implement NMFS 2009 Salmonid BiOp

In April 2009, NMFS released a BiOp specific to listed Pacific salmon and steelhead species for various pesticides, including methomyl³². EPA is choosing to implement this BiOp through its registration review process and is proposing alternative RPAs to those described in the 2009 NMFS BiOp in this proposed revision to the PID. The Agency is proposing alternative RPAs for two reasons: 1) to account for the

³⁰ *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022)

³¹ The NMFS biological opinion for carbaryl, carbofuran and methomyl can be found at <https://media.fisheries.noaa.gov/dam-migration/63806531carbamate.pdf>

³² NMFS. 2009. *Endangered Species Act Section 7 Consultation Biological Opinion Environmental Protection Agency Registration of Pesticides Containing, Carbaryl, Carbofuran, and Methomyl*. April 20, 2009. National Marine Fisheries Service.

nationwide mitigation measures added to the methomyl labels since 2009 or already negotiated with registrants as part of FIFRA registration review and 2) to align mitigation measures with NMFS' current approach for reducing pesticide loading in aquatic environments (*i.e.*, point system), as described in the most current BiOp to the Agency³³.

EPA concludes that the proposed FIFRA mitigation largely addresses the potential effects from the use of methomyl to Pacific salmon and steelhead species. However, additional mitigation is needed for some application scenarios to implement NMFS BiOp. EPA proposes the following additional mitigation measures for all uses of methomyl (excluding the 1% AI fly bait formulations), to be implemented on the nationwide label:

1. Runoff Reduction Language for All Agricultural Uses

EPA proposes that applications of methomyl may not be made to saturated soil, or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application. See Appendix A for specific language. See Appendix D for more on EPA's conclusions on the alternative necessary mitigation to implement NMFS BiOp for listed Pacific salmon and steelhead species. This mitigation has been discussed with the technical registrants and the registrants have provided written commitment to implement this restriction. Additionally, NMFS is aware of these commitments.

2. Maximum Annual Application Rate for Agricultural Uses

EPA proposes that agricultural uses of methomyl be restricted to a maximum annual application rate of 13 lbs AI/A/year. The only agricultural use of methomyl that has a label-specified maximum annual application rate is sweet corn, which has a maximum annual application rate of 7 lbs AI/A/year. Based on EPA's comparison between the NMFS 2009 Salmonid BiOp, the current label restrictions and the FIFRA-negotiated mitigation measures (proposed in the 2020 PID), growers who use more than 13 lbs AI/A/year would require additional mitigation measures beyond those already proposed in the 2020 PID³⁴ to implement the NMFS 2009 Salmonid BiOp. Therefore, the Agency proposes that this maximum yearly application rate be added to all methomyl labels with agricultural uses. EPA does not expect this restriction to negatively impact users, based on previous Agency³⁵ assessments, as typical rates of application for methomyl to high value crops are significantly lower than 13 lbs AI/A/year. See Appendix D for more on EPA's conclusions on the necessary mitigation to implement NMFS BiOp for listed Pacific salmon and steelhead species. This mitigation has been discussed with the technical registrants and the registrants have provided written commitment to implement this restriction. Additionally, NMFS is aware of these commitments.

3. Necessary Label Language for Reporting Ecological Incidents

In addition to the above label language, EPA has determined that the following product labeling is necessary to address the NMFS salmonid BiOp: ***“Reporting Ecological Incidents: To report ecological incidents, including mortality, injury, or harm to plants and animals, call [insert registrant phone number].”*** NMFS generally requires language to improve the reporting of ecological incidents in its pesticide biological opinions, as it did in its 2009 salmonid BiOp for methomyl (although this BiOp contained an older version of this statement). The language presented here reflects NMFS most recent approach to ecological incident label language. The Agency is coordinating with NMFS on this updated language and on other aspects of the 2009 BiOp.

³³ <https://www.fisheries.noaa.gov/resource/document/biological-opinion-chlorpyrifos-diazinon-and-malathion>

³⁴ EPA. 2020. *Methomyl and Thiodicarb Proposed Interim Registration Review Decision Case Numbers 0028 (methomyl) 2675 (thiodicarb)*. <https://www.regulations.gov/document/EPA-HQ-OPP-2010-0751-0041>

³⁵ EPA. 2020. *Usage, Benefits and Impacts of Possible Mitigation for Methomyl (PC # 090301) and Thiodicarb (PC # 114501)*. <https://www.regulations.gov/document/EPA-HQ-OPP-2010-0751-0048>

C. Proposed Pilot Species-Specific Early-ESA Mitigations

The proposed mitigation measures for the pilot species would be included on BLT,³⁶ with a reference to this on the labels. These mitigation measures are spatially explicit (and some are temporally explicit) and are, therefore, only applicable to growers and applicators within the specified geographic areas (and in certain time periods for temporally explicit mitigations).

1. Valley Elderberry Longhorn Beetle

To address the prediction of likely J/AM of the Valley elderberry longhorn beetle, EPA is proposing spray drift mitigations for methomyl applications made within the beetle's range (see **Figure 1, Appendix C**) during the beetle's adult life stage (March until June) when this species is most susceptible to insecticides. Below, the proposed mitigations and how they address the predicted likelihood of J/AM are described based on the geographic area (the species range) where the mitigations are intended to apply. For more details, see Appendix B.

Mitigations within the Species' Range of the Valley Elderberry Longhorn Beetle

EPA is proposing that aerial applications made within the beetle's range (see **Figure 1, Appendix C**) from the first day of March until the fifteenth day of June adhere to a maximum single application rate of 0.6 lbs AI/A and use coarse or coarser droplet sizes. Additionally, from the first day of March until the fifteenth day of June, if wind is blowing in the direction of riparian habitat³⁷ within the beetle's range, users would be prohibited from using ground or aerial application methods within the specified distance (buffer) from riparian habitats when applying all non-granular formulations. Buffer distances vary based on application type (ground or aerial) and application rate. For more details and specific buffer distances, see below and Appendix B.

The proposed spray drift mitigation measures (droplet size and maximum single application rate) address the Valley elderberry longhorn beetle's predicted likelihood of jeopardy by reducing the load of methomyl intercepted by the riparian habitat from spray drift during the species' most vulnerable life stage. Additionally, wind directional buffer distances will minimize drift to the beetle's habitat, further minimizing the species' exposure to methomyl.

Overlap and Impacts to Growers from Proposed Early-ESA Mitigations for the Valley Elderberry Longhorn Beetle

The methomyl use data layers (UDLs)³⁸ with low overlap (<5%) with the Valley elderberry longhorn beetle range are corn, alley crops,³⁹ other row crops, cotton, citrus, soybeans, and wheat. The UDLs with medium overlap (5-10%) with the beetle's range are other grains, alfalfa, and vegetables and ground fruit. The other orchard UDL has high overlap (>10%) with the Valley elderberry longhorn beetle range. Because these uses of methomyl overlap with the Valley elderberry longhorn beetle range, growers of

³⁶ <https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins>

³⁷ Riparian habitat is defined as "Areas bordering streams, lakes, rivers, and other watercourses. These areas have high water tables and support plants that require saturated soils during all or part of the year. Riparian areas include both wetland and upland zones." This definition can be found at https://sor.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do

³⁸ For a list of use sites included in each UDL, see Appendix 1-5, Table 2 of Final BE for methomyl, available at <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

³⁹ Alley crops are crops grown between rows in orchards. Methomyl is only used on alley crops only in California. The alley crop UDL represents several crop data layers including the Orchards and vineyards UDL and the vegetables and ground fruit UDL. Alley Crop UDL is evaluate through surrogate usage data. For more information, see the Final BE for methomyl, Appendix 1-7, p. 6.

these crops could be impacted by the proposed mitigations, particularly if their fields are adjacent or proximal to riparian areas. For more details on the overlap of methomyl use and the Valley elderberry longhorn beetle's range, see *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022).

Control of insects, including those that are targeted by methomyl, is needed from March to June in many crops within the vegetable and ground fruit UDL, where methomyl is frequently used. Some of the crop cycles of these vegetable crops will also be more affected than others, including Spring and Summer plantings of celery, onion, lettuce, garlic, spinach, and sweet corn. Growers who need control in this period will need to adopt buffers, apply when the wind is blowing away from the riparian habitat, or use alternative insecticides.

Mandatory droplet size requirements can cause reductions in performance due to reduced contact with target pests which could, in turn, reduce yield and/or increase selection pressure for the evolution of insecticide resistance. Growers could compensate by increasing application rates, if allowed by the label, making more insecticide applications, or using alternative products, which could increase production costs. Mandatory droplet sizes may also complicate growers' ability to tank mix multiple pesticides in a single application.

Directional wind restrictions and buffer requirements may complicate pest management for growers who wish to use methomyl. Before the start of the growing season, applicators need to decide whether to use an alternative when wind blows toward the riparian habitat or wait to use methomyl when the wind direction changes. Growers who choose to not use methomyl to avoid this uncertainty may face losses in net operating revenue (small in most crops, but substantial in sweet corn).

Some growers near riparian areas may plan to use methomyl but find the wind blowing toward the riparian habitat when they want to apply. These growers may choose to not treat the buffer area and return at a later point to apply methomyl in that area, at increased time and equipment cost. Other growers who only have small amounts of their field close to riparian areas may choose to forego methomyl applications within the buffer area and risk pest damage.

If growers plan to use methomyl and are unable to do so due to unfavorable wind direction, these growers will need to either acquire and apply an alternative pesticide (which may be difficult given the time-critical nature of insect control) or else be unable to control methomyl-targeted pests in the buffer area of their field.

Applications made outside of the proposed temporal restriction window (March until June) would not be impacted by the proposed mitigations. Further, any grower within the range of the Valley elderberry longhorn beetle making a ground or aerial application of methomyl greater than 50 or 230 feet, respectively, away from a riparian area would not be impacted by the proposed wind directional or buffer mitigations. Impacts may be minimized because the proposed mitigations are both geographically, temporally, and spatially explicit. For more information on the potential impacts of the proposed early-ESA mitigations see *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl* (PC Code# 090301) (September 29, 2022), which is available on the public docket.

2. Vernal Pool Tadpole Shrimp

To address the prediction of likely J/AM to the vernal pool tadpole shrimp, EPA is proposing spray drift mitigations, runoff mitigations, and use prohibitions for methomyl applications made within the tadpole shrimp's range and designated critical habitat (see **Figures 2 and 3, Appendix C**). Below, the proposed

mitigations and how they address predicted likelihood of J/AM is described based on the geographic area (either the species range or designated critical habitat) where the mitigations are intended to apply. For more details, see Appendix B.

Mitigations within the Designated Critical Habitat of the Vernal Pool Tadpole Shrimp

EPA is proposing to prohibit all applications of methomyl within the vernal pool tadpole shrimp's designated critical habitat (see **Figure 3, Appendix C**) from the first of November through the first day of March when the species is likely to be present in vernal pools.

EPA is proposing spray drift buffers and runoff restrictions within the vernal pool tadpole shrimp's designated critical habitat (see **Figure 3, Appendix C**). Specifically, if wind is blowing in the direction of vernal pools⁴⁰ within the designated critical habitat, users applying non-granular formulations may not use ground or aerial application methods within the specified distance (buffer) from the vernal pools. Buffer distances were established based on application method (i.e., ground or aerial) and application rate. For more details and specific buffer distances, see Appendix B. Additionally, EPA proposes that runoff reduction mitigation is necessary to address effects within the designated critical habitat of the vernal pool tadpole shrimp. Runoff reduction measures are also being proposed for the nationwide label to address the 2009 NMFS Salmonid BiOp (See Section IV.B). Because these measures are being proposed for the nationwide label in response to the Salmonid BiOp, the runoff reduction mitigation measures (which are predicted to address risks to both the tadpole shrimp and listed Pacific salmon and steelhead species) will therefore be included in the general label changes (Appendix A) rather than the BLT language (Appendix B). EPA proposes that applications of methomyl may not be made to saturated soil, or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application. For more details on the runoff reduction mitigation, see Appendix A.

The proposed use prohibition from November 1st until March 1st addresses predicted likelihood of J/AM by avoiding direct applications to the tadpole shrimp's designated critical habitat and, therefore, minimizes direct exposure to methomyl for the tadpole shrimp when the species is most active in vernal pools. The proposed ground and aerial buffer mitigations from March 2nd through October 31st are intended to minimize effects to the vernal pool tadpole shrimp from ground or aerial drift of methomyl by minimizing the species' exposure on the sites where vernal pools and ephemeral wetlands occur in designated critical habitat. Rainfall and soil saturation mitigations are being proposed to address predicted likelihood of jeopardy by minimizing runoff that could potentially reach vernal pools and cause exposure to vernal pool tadpole shrimp and the vernal pools it inhabits within the designated critical habitat.

Mitigations within the Species' Range of the Vernal Pool Tadpole Shrimp

EPA is proposing that both ground and aerial applications be prohibited within specified distances (buffer) from vernal pools and ephemeral wetland within the tadpole shrimp's range (see **Figure 2, Appendix C**). Buffer distances are based on application method (e.g., ground or aerial) and application rate. For more details and specific buffer distances, see Appendix B. Additionally, EPA proposes that runoff reduction mitigation is necessary to address effects within the range. Runoff reduction measures are also being proposed for the nationwide label to address the 2009 NMFS Salmonid BiOp (See Section IV.B). Because these measures are being proposed for the nationwide label in response to the Salmonid BiOp, the runoff reduction mitigation measures (which address risks to both the tadpole shrimp and the

⁴⁰ Vernal pools are defined as "seasonal depression wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall." This definition can be found at <https://www.epa.gov/wetlands/vernal-pools>

Salmonid BiOP) will therefore be included in the general label changes (Appendix A) rather than the BLT language (Appendix B). EPA proposes that applications of methomyl may not be made to saturated soil, or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application. For more details on the runoff reduction mitigation, see Appendix A.

The proposed buffers are intended to minimize effects to the vernal pool tadpole shrimp from ground or aerial drift of methomyl by minimizing the species' exposure on the sites where vernal pools and ephemeral wetlands occur in the range. Rainfall and soil saturation restrictions address predicted likelihood of jeopardy by minimizing runoff that could potentially reach vernal pools and cause exposure to vernal pool tadpole shrimp and the vernal pools it inhabits within the range.

Overlap and Impacts to Growers from Proposed Early-ESA Mitigations for the Vernal Pool Tadpole Shrimp

The methomyl UDLs⁴¹ with low overlap (<5%) with the vernal pool tadpole shrimp's designated critical habitat are other grains, vegetables and ground fruit, corn, other row crops, cotton, citrus, soybeans, and wheat. The only UDL with medium overlap (5-10%) with the tadpole shrimp's designated critical habitat is alfalfa. The orchards and alley crop UDLs have high overlap (>10%) with the vernal pool tadpole shrimp's designated critical habitat. Because these uses of methomyl overlap with the vernal pool tadpole shrimp's designated critical habitat, growers of these crops could be impacted by the proposed mitigation, particularly if their fields are adjacent to vernal pools or ephemeral wetland areas. For more details on the overlap of methomyl use and the vernal pool tadpole shrimp's designated critical habitat, see *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022).

Growers who produce lettuce and spinach during the winter may need to control insects, including those that are targeted by methomyl, in the period from November to March. In these months, growers in these areas would have to use other means of pest control. Other pest control methods may result in net operating revenue losses and/or complicate a grower's insecticide resistance management program. However, because the geographic extent of the designated critical habitat units of the vernal pool tadpole shrimp is relatively small (see **Figure 3, Appendix C**), the geographic extent of the proposed temporal use prohibition is also small, which minimizes the number of growers expected to be impacted by this mitigation.

Spring, summer, and fall cropping cycles of celery, onion, lettuce, garlic, spinach, and sweet corn need insect control from March to October. For growers using aerial applications and high application rates, compliance with the largest buffer may result in high costs, and growers may choose to use alternatives to methomyl or may be able to treat only part of their field with methomyl in this period. Rainfall and soil saturation restrictions may preclude time-sensitive applications of methomyl. If pest control is necessary in that window of time, growers would need to seek alternatives to methomyl or face yield losses.

In California, there is a strongly seasonal rainy season, with most rainfall historically occurring between December and March. For crops cultivated during the winter months (November to March), restricting applications when rain is expected within 48 hours after application may limit the available hours applicators are able to apply methomyl and could delay time-sensitive insecticide applications, but there are long stretches of time in the summer when there may be few impacts from rain restrictions. In the summer, there may be instances when a pest suddenly appears, or pest density rapidly increases that necessitates the intervention of a control measure. This could occur within 48 hours of an overhead

⁴¹ For a list of use sites included in each UDL, see Appendix 1-5, Table 2 of Final BE for methomyl, available at <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

irrigation event. EPA expects that some growers may be affected by this mitigation, especially with sudden pest outbreaks that require immediate attention in fields where overhead irrigation is in use. Additionally, growers may be unable to make ground applications to saturated soil, which would further shrink the window of time available for growers to apply methomyl as it could encompass the period after a rainfall event or after irrigation. The impact to users would vary by soil textural class, as soils with greater clay content will retain water longer than sandier soils, possibly affecting the potential application window for methomyl. As growers generally aim to avoid driving equipment in fields when the soils are saturated, a restriction on aerial applications also restricts applications on saturated soils. This mitigation, in combination with a 48-hour rainfall restriction, would mean that growers would be unable to apply methomyl in the period from the start of the forecasted rain restriction until after the soil is no longer saturated. However, impacts may be minimized because the proposed mitigations are both geographically and temporally explicit. For more information on the potential impacts of the proposed early-ESA mitigations see *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022), which is available on the public docket.

3. *California Tiger Salamander*

To address the prediction of likely J/AM to the Central California tiger salamander, EPA is proposing spray drift mitigations, runoff mitigations, and use prohibitions for methomyl applications made within the tiger salamander's range and/or designated critical habitat (see **Figures 4 and 5, Appendix C**). Below, the proposed mitigations and how they address predicted likelihood of J/AM is described based on the geographic area (either the species' range or designated critical habitat) where the mitigations are intended to apply. For more details, see Appendix B.

Mitigations within the Designated Critical Habitat of the Central Distinct Population Segment of the California Tiger Salamander

EPA is proposing to prohibit all applications of methomyl within the designated critical habitat of the Central California tiger salamander (see **Figure 5, Appendix C**). This prohibition is proposed to address predicted likelihood of J/AM by reducing the load of methomyl experienced by the tiger salamanders during the vulnerable life stages of both the aquatic and terrestrial phases (larval development and metamorphosis, and reproduction, respectively).

Mitigations within the Range of the Central Distinct Population Segment of the California Tiger Salamander

EPA is proposing spray drift buffers and runoff restrictions within the California tiger salamander's range (see **Figure 3, Appendix C**). Specifically, if wind is blowing in the direction of vernal pools⁴² and ponds within the range, users applying non-granular formulations may not use ground or aerial application methods within the specified distance (buffer) from vernal pools and ponds. Buffer distances were established based on application method (i.e., ground or aerial) and application rate. For more details and specific buffer distances, see Appendix B. Additionally, EPA proposes that runoff reduction measures are necessary to address effects within the range. Runoff reduction measures are also being proposed for the nationwide label to address the 2009 NMFS Salmonid BiOp (See Section IV.B). Because these measures are being proposed for the nationwide label in response to the Salmonid BiOp, the runoff reduction mitigation measures (which are predicted to address risks to both the California Tiger Salamander and

⁴² Vernal pools are defined as "seasonal depression wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall." This definition can be found at <https://www.epa.gov/wetlands/vernal-pools>

listed Pacific salmon and steelhead species) will therefore be included in the general label changes (Appendix A) rather than the BLT language (Appendix B). EPA proposes that applications of methomyl may not be made to saturated soil, or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application. For more details on the runoff reduction mitigation, see Appendix A.

The proposed buffer mitigations are intended to minimize effects to the California tiger salamander from aerial drift of methomyl and, therefore, minimizing the species' exposure. Rainfall and soil saturation mitigations are being proposed to address predicted likelihood of jeopardy by minimizing runoff that could potentially reach vernal pools and cause high-dose exposure to California tiger salamander and the vernal pools and/or ponds it inhabits.

Overlap and Impacts to Growers from Proposed Early-ESA Mitigations for the California Tiger Salamander

The methomyl UDLs⁴³ with low overlap (<5%) with the California tiger salamander's designated critical habitat and range are corn, other row crops, cotton, citrus, soybeans, and wheat. The UDLs with medium overlap (5-10%) with the salamander's designated critical habitat and range are other orchards, other grains, alfalfa, vegetables and ground fruit, and alley crops.⁴⁴ No UDLs have high overlap (>10%) with the salamander's designated critical habitat and range. Because these uses of methomyl overlap with the California tiger salamander's designated critical habitat, growers of these crops could be impacted by the proposed mitigations, particularly if their fields are adjacent or proximal to vernal pools, ephemeral wetland areas, or ponds. For more details on the overlap of methomyl use and the California tiger salamander's range and designated critical habitat, see *Methomyl Pilot Evaluating Proposed Mitigations Intended to Avoid Jeopardizing Three Federally Listed Endangered and Threatened Species and Avoid Adversely Modifying Two Designated Critical Habitats* (September 29, 2022).

EPA's proposal to prohibit the use of methomyl within the designated critical habitat means that growers would need to use other means to control pests normally targeted by methomyl. Other pest control methods may result in net operating revenue losses and/or resistance management complications. These losses may be particularly severe for sweet corn growers, who may face an 8-20% decrease in net operating revenue as a result of being unable to use methomyl *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022). However, because the geographic extent of the designated critical habitat units of the California tiger salamander is relatively small (see **Figure 5, Appendix C**), the geographic extent of the proposed use prohibition is also small, which minimizes the potential growers impacted by this mitigation.

Spring, summer, and fall cropping cycles of celery, onion, lettuce, garlic, spinach, and sweet corn need insect control from March to October. For growers using aerial applications and high rates within the range of the tiger salamander, compliance with the largest buffer may result in high costs, and growers may choose to use alternatives to methomyl or may be only able to treat part of their field with methomyl in this period. Rainfall and soil saturation restrictions may preclude time-sensitive applications of methomyl. If pest control is necessary in that window of time, growers would need to seek alternatives to methomyl or face yield losses.

⁴³ For a list of use sites included in each UDL, see Appendix 1-5, Table 2 of Final BE for methomyl, available at <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

⁴⁴ Alley crops are crops grown between rows in orchards. Methomyl is only used on alley crops only in California. The alley crop UDL represents several crop data layers including the Orchards and vineyards UDL and the vegetables and ground fruit UDL. Alley Crop UDL is evaluate through surrogate usage data. For more information, see the Final BE for methomyl, Appendix 1-7, p. 6.

In California, there is a strongly seasonal rainy season, with most rainfall historically occurring between December and March. For crops cultivated during the winter months (November to March), restricting applications when rain is expected within 48 hours after application may limit the available hours applicators are able to apply methomyl and could delay time-sensitive insecticide applications, but there are long stretches of time in the summer when there may be few impacts from rain restrictions. In the summer, there may be instances when a pest suddenly appears, or pest density rapidly increases that necessitates the intervention of a control measure. This could occur within 48 hours of an overhead irrigation event. EPA expects that some growers may be affected by this mitigation, especially with sudden pest outbreaks that require immediate attention in fields where overhead irrigation is in use. Additionally, growers may be unable to make ground applications to saturated soil, which would further shrink the window of time available for growers to apply methomyl as it could encompass the period after a rainfall event or after irrigation. The impact to users would vary by soil textural class, as soils with greater clay content will retain water longer than sandier soils, possibly affecting the potential application window for methomyl. As growers generally aim to avoid driving equipment in fields when the soils are saturated, a restriction on aerial applications also restricts applications on saturated soils. This mitigation, in combination with a 48-hour rainfall restriction, would mean that growers would be unable to apply methomyl in the period from the start of the forecasted rain restriction until after the soil is no longer saturated. However, impacts may be minimized because the proposed mitigations are both geographically and temporally explicit. For more information on the potential impacts of the proposed early-ESA mitigations see *Benefits of Methomyl in California and Impacts of Potential Endangered Species Act Mitigation for Methomyl (PC Code# 090301)* (September 29, 2022), which is available on the public docket.

V. Next Steps and Timeline

The Agency is issuing this memorandum as a proposal for revisions to the PID to: (1) propose additional mitigation to address certain effects to listed species identified in the Final BE for Methomyl;⁴⁵ (2) propose alternative RPAs to those described in the 2009 NMFS BiOp;⁴⁶ and (3) provide an opportunity for public comment on the proposed mitigations. These proposed measures supplement the mitigation measures previously proposed in the *Proposed Interim Registration Review Decision Case Numbers 0028 (methomyl) and 2675 (thiodicarb)*. EPA proposes the additional label language identified in Appendix A and the BLT language identified in Appendix B of this memorandum to address the predicted likelihood of J/AM to the three pilot species. Furthermore, EPA is proposing alternative RPAs to those described in the 2009 NMFS BiOp to implement the BiOp.

A Federal Register Notice will announce the availability of this proposal for revisions to the PID and will open a 60-day comment period. The Agency is not soliciting comment on any other aspects of the PID other than those specifically identified in this document. EPA will consider the comments received and determine next steps in registration review. Further, EPA may issue a memorandum identifying additional mitigation requirements and revisions to the PID.

Once a decision is issued for methomyl, the methomyl registrants must submit amended labels that include the label changes described in that decision document. The revised labels and requests for amendment of registrations must be submitted to the Agency for review within 60 days following issuance of the decision document in the docket.

⁴⁵ Final National Level Listed Species Biological Evaluation for Methomyl. Available at <https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-methomyl>

⁴⁶ The NMFS biological opinion for carbaryl, carbofuran and methomyl can be found at <https://media.fisheries.noaa.gov/dam-migration/63806531carbamate.pdf>

Appendix A: Additional Proposed Labeling Changes for Methomyl Products

Table 1: Proposed additional label language for methomyl products

Description	Proposed Label Language for Methomyl Products	Placement on Label
	Technical and Manufacturing Use Products	
Endangered Species Protection Requirements	<p>“This product may only be formulated into end-use products that contain the following language on their labeling when they are released for shipment:”</p> <p><i>“ENDANGERED SPECIES PROTECTION REQUIREMENTS” (to be placed at the beginning of the Directions for Use section of all end-use product labels) “It is a Federal offense to use any pesticide in a manner that results in an unauthorized “take” (e.g., kill or otherwise harm) of an endangered species, and certain threatened species, under the Endangered Species Act Section 9. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. You must obtain a Bulletin no earlier than six months before using this product. To obtain Bulletins, consult http://www.epa.gov/espp/, call 1-844-447-3813, or email ESPP@epa.gov. You must use the Bulletin valid for the month in which you will apply the product.”</i></p>	Directions for Use
	End Use Products	
Endangered Species Protection Requirements (1% AI fly bait formulations exempted)	<p><i>“ENDANGERED SPECIES PROTECTION REQUIREMENTS: It is a Federal offense to use any pesticide in a manner that results in an unauthorized “take” (e.g., kill or otherwise harm) of an endangered species, and certain threatened species, under the Endangered Species Act Section 9. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. You must obtain a Bulletin no earlier than six months before using this product. To obtain Bulletins, consult http://www.epa.gov/espp/, call 1-844-447-3813, or email ESPP@epa.gov. You must use the Bulletin valid for the month in which you will apply the product.”</i></p>	Directions for Use, under the heading “Endangered Species Protection Requirements”
Reporting ecological incidents (RPM from NMFS salmonid BiOp)	<p>“Reporting Ecological Incidents: To report ecological incidents, including mortality, injury, or harm to plants and animals, call [insert registrant phone number].”</p> <p>Note: Each end-use registrant is required to provide a phone number for its products.</p>	Directions for Use

Description	Proposed Label Language for Methomyl Products	Placement on Label
Annual Application Rate Limit	<p>“Do not apply more than 13 lbs AI/ acre/ year.”</p>	Directions for Use
Runoff Reduction Statements	<p>“Do not apply this product when soil is saturated or above field capacity. Do not apply during rain. Do not apply when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application. Excessive rainfall within 48 hours after application may cause unintended run-off of pesticide application.”</p>	Directions for Use

Appendix B: Proposed Bulletins Live! Two Use Limitation Language for Methomyl Products

Table 1: Proposed Bulletins Live Language for the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

EPA Registration Numbers	Use Limitation	Pesticide Use Limitation Area (PULA)
End use products formulated as water soluble powder in water-soluble packages or as water-soluble liquid		
82557-2 82557-3 83100-27 83100-28 89167-91 352-342 352-384	<p><u>From March 1st through June 15th:</u></p> <p>Ground Applications: Do not apply by <u>ground</u> application methods within 50 feet of riparian habitat⁴⁷ if the wind is blowing in the direction of the habitat.</p> <p>Aerial Applications: Use coarse or coarser droplet sizes (ASABE S641) Do not exceed a maximum single application rate of 0.6 lbs AI/A Do not apply by <u>aerial</u> application methods within the following distances from riparian habitats if the wind is blowing in the direction of the habitat:</p> <ul style="list-style-type: none"> • 155-feet for application rates <0.3 lbs AI/A; • 205-feet for application rates 0.3 – 0.5 lb AI/A; • 230-feet for application rates 0.5-0.6 lbs AI/A. <p><i>Riparian habitat is defined as “Areas bordering streams, lakes, rivers, and other watercourses. These areas have high water tables and support plants that require saturated soils during all or part of the year. Riparian areas include both wetland and upland zones.” This definition can be found by searching “riparian habitat” at https://sor.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do.</i></p>	Within the USFWS designated range of the Valley elderberry longhorn beetle (Appendix C Figure 1) and 230 feet outside the range.

⁴⁷ Riparian habitat is defined as “Areas bordering streams, lakes, rivers, and other watercourses. These areas have high water tables and support plants that require saturated soils during all or part of the year. Riparian areas include both wetland and upland zones.” This definition can be found at https://sor.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do

Table 2: Proposed Bulletins Live Language for the Vernal pool tadpole shrimp (*Lepidurus packardi*)

EPA Registration Numbers	Use Limitation	Pesticide Use Limitation Area (PULA)
End use products formulated as water soluble powder in water-soluble packages or as water-soluble liquid		
82557-2 82557-3 83100-27 83100-28 89167-91 352-342 352-384	<p>Ground Applications: Do not apply by <u>ground</u> application methods within 50 feet of vernal pools⁴⁸ or other ephemeral/seasonal water habitats (including stock ponds) if the wind is blowing in the direction of the habitat.</p> <p>Aerial Applications: Do not apply by <u>aerial</u> application methods within the following distances from vernal pools or other ephemeral water habitats (including stock ponds) if the wind is blowing in the direction of the habitat:</p> <ul style="list-style-type: none"> • 125-feet for application rates <0.3 lbs AI/A; • 175-feet for application rates 0.3 – 0.5 lb AI/A; • 200-feet for application rates 0.5-0.9 lbs AI/A. <p><i>Vernal pools are defined as “seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall.” This definition can be found at https://www.epa.gov/wetlands/vernal-pools.</i></p>	Within the USFWS designated range of the vernal pool tadpole shrimp (Appendix C Figure 2) and 2030 feet outside the range.
82557-2 82557-3 83100-27 83100-28 89167-91 352-342 352-384	<p><u>From November 1st through March 31st:</u> Do not apply methomyl. Use of methomyl in this area is prohibited</p> <p><u>From April 1 through October 31</u></p> <p>Ground Applications: Do not apply by <u>ground</u> application methods within 50 feet of vernal pools or other ephemeral/seasonal water habitats (including stock ponds) if the wind is blowing in the direction of the habitat.</p> <p>Aerial Applications: Do not apply by <u>aerial</u> application methods within the following distances from vernal pools or other ephemeral water habitats (including stock ponds) if the wind is blowing in the direction of the habitat:</p> <ul style="list-style-type: none"> • 125-feet for application rates <0.3 lbs AI/A; • 175-feet for application rates 0.3 – 0.5 lb AI/A; • 200-feet for application rates 0.5-0.9 lbs AI/A. <p><i>Vernal pools are defined as “seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and</i></p>	Within the USFWS designated critical habitat of the vernal pool tadpole shrimp (Appendix C Figure 3) and 200 feet outside the designated critical habitat.

⁴⁸ Vernal pools are defined as “seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall.” This definition can be found at <https://www.epa.gov/wetlands/vernal-pools>

	<i>fall.</i> ” This definition can be found at https://www.epa.gov/wetlands/vernal-pools .	
End Use Products Formulated as Granules		
57242-2	<p><u>From November 1st through March 31st:</u> Do not apply methomyl. Use of methomyl in this area is prohibited</p>	Within the USFWS designated critical habitat of the vernal pool tadpole shrimp (Appendix C Figure 3) and 200 feet outside the designated critical habitat.

Table 3: Proposed Bulletins Live Language for the Central DPS of the California Tiger Salamander (*Ambystoma californiense*)

EPA Registration Numbers	Use Limitation	Pesticide Use Limitation Area (PULA)
End use products formulated as water soluble powder in water-soluble packages or as water-soluble liquid		
82557-2 82557-3 83100-27 83100-28 89167-91 352-342 352-384	<p>Ground Applications: Do not apply by <u>ground</u> application methods within 50 feet of vernal pools or other ephemeral/seasonal water habitats (including stock ponds) if the wind is blowing in the direction of the habitat.</p> <p>Aerial Applications: Do not apply by <u>aerial</u> application methods within the following distances from vernal pools or other ephemeral water habitats (including stock ponds) if the wind is blowing in the direction of the habitat:</p> <ul style="list-style-type: none"> • 125-feet for application rates <0.3 lbs AI/A; • 175-feet for application rates 0.3 – 0.5 lb AI/A; • 200-feet for application rates 0.5-0.9 lbs AI/A. <p><i>Vernal pools are defined as “seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall.” This definition can be found at https://www.epa.gov/wetlands/vernal-pools.</i></p>	Within the USFWS designated range of the Central DPS of the California tiger salamander (Appendix C Figure 4) and 200 feet outside the range.
82557-2 82557-3 83100-27 83100-28 89167-91 352-342 352-384	Do not apply methomyl. Use of methomyl in this area is prohibited	Within the USFWS designated critical habitat of the Central DPS of the California tiger salamander (Appendix C Figure 5) and 200 feet outside the designated critical habitat.
End Use Products Formulated as Granules		
57242-2	Do not apply methomyl. Use of methomyl in this area is prohibited	Within the USFWS designated critical habitat of the Central DPS of the California tiger salamander (Appendix C Figure 5) and 200 feet outside the designated critical habitat.

Appendix C: Ranges and Critical Habitats of Pilot Species for Early-ESA Mitigation

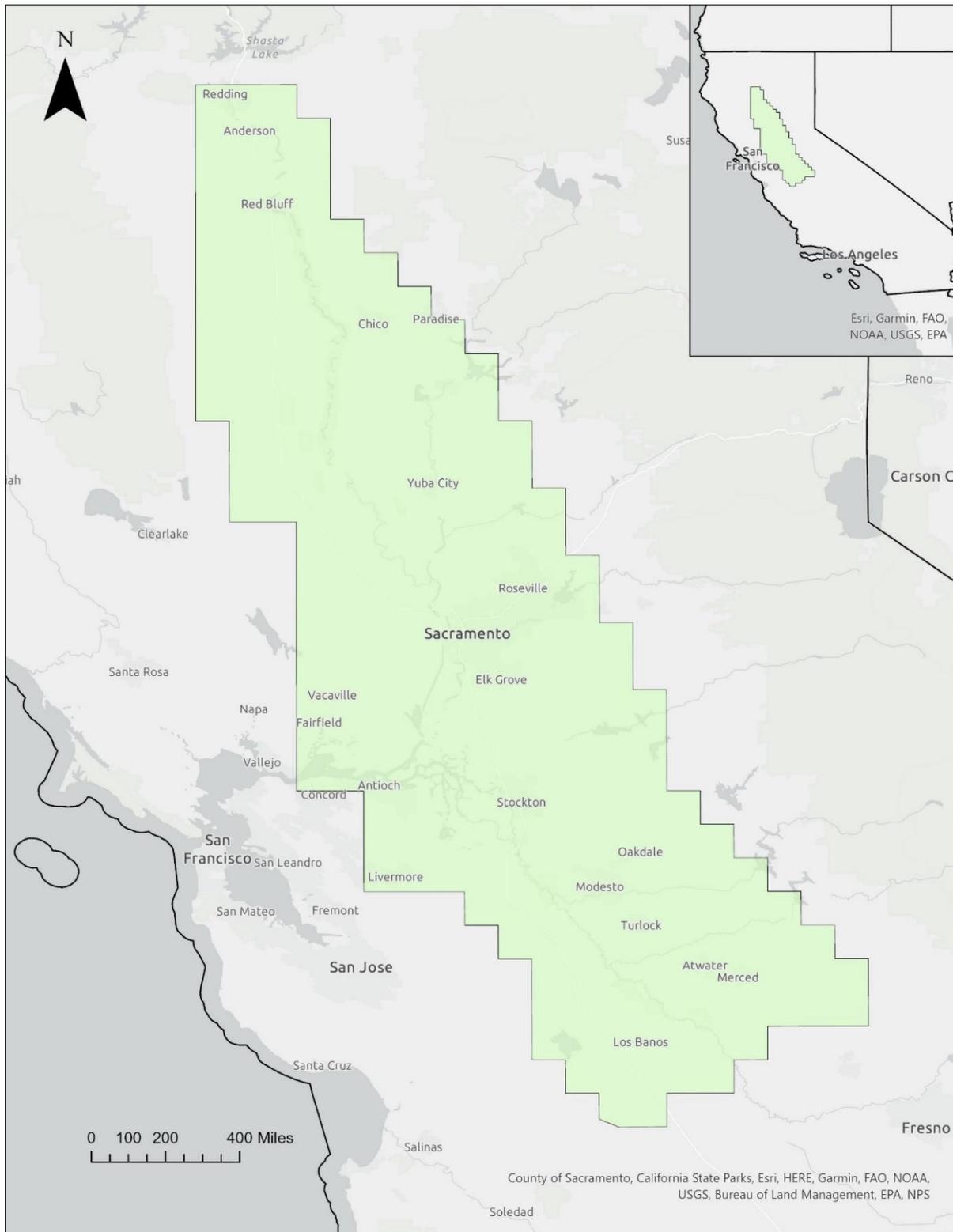


Figure 1. Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) Range.

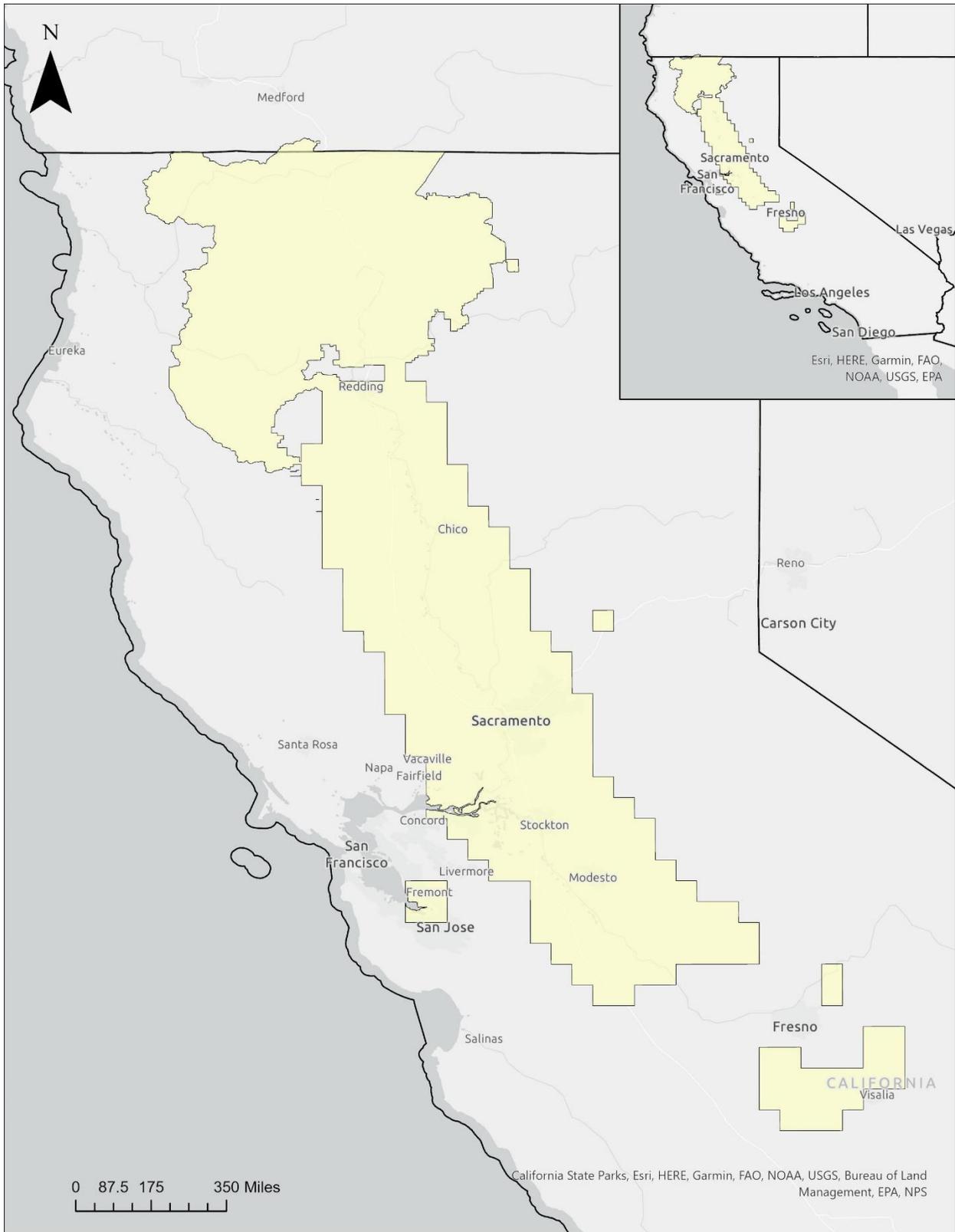


Figure 2. Vernal Pool Tadpole Shrimp (*Lepidurus packardii*) Range.

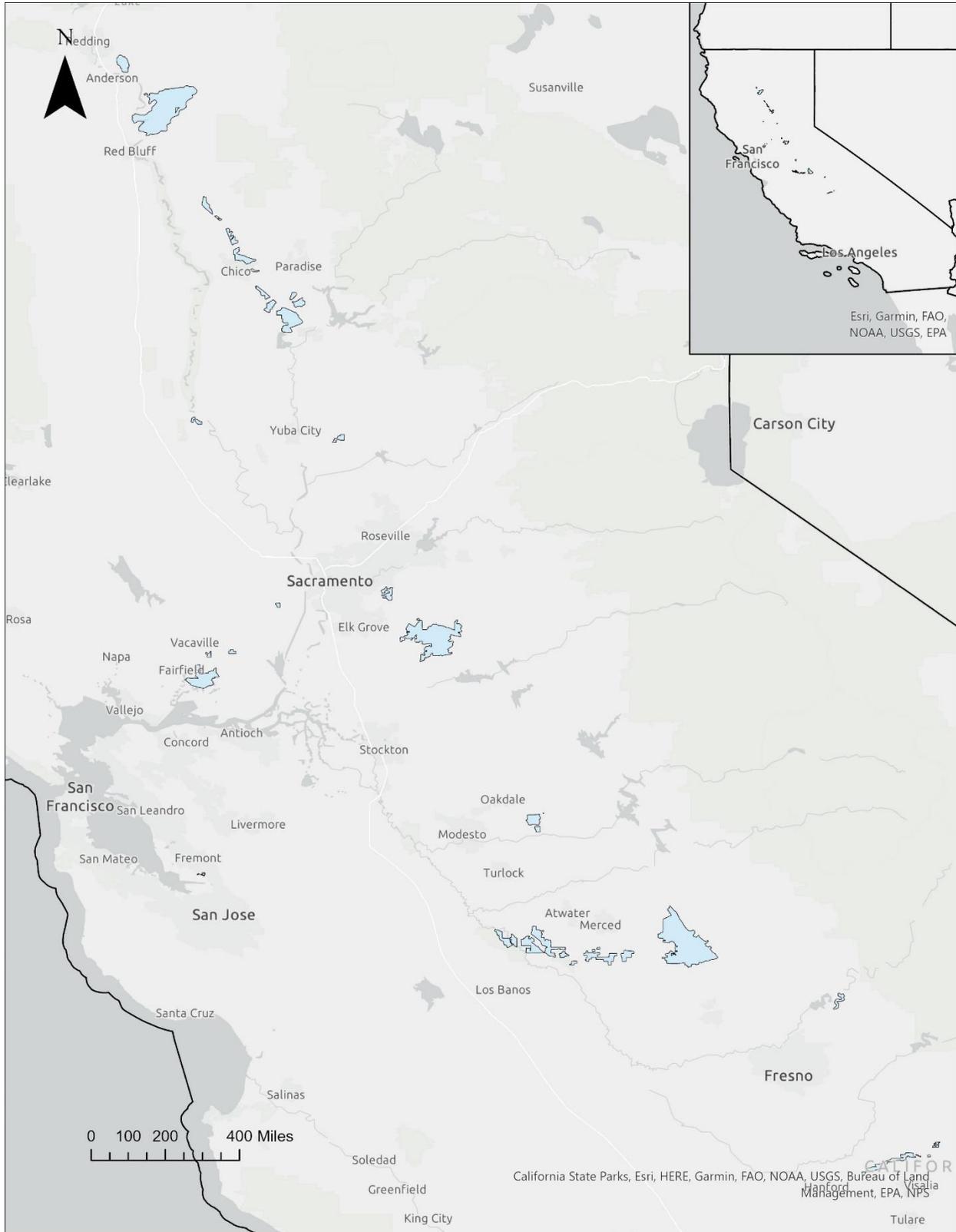


Figure 3. Vernal Pool Tadpole Shrimp (*Lepidurus packardii*) Designated Critical Habitat Units.

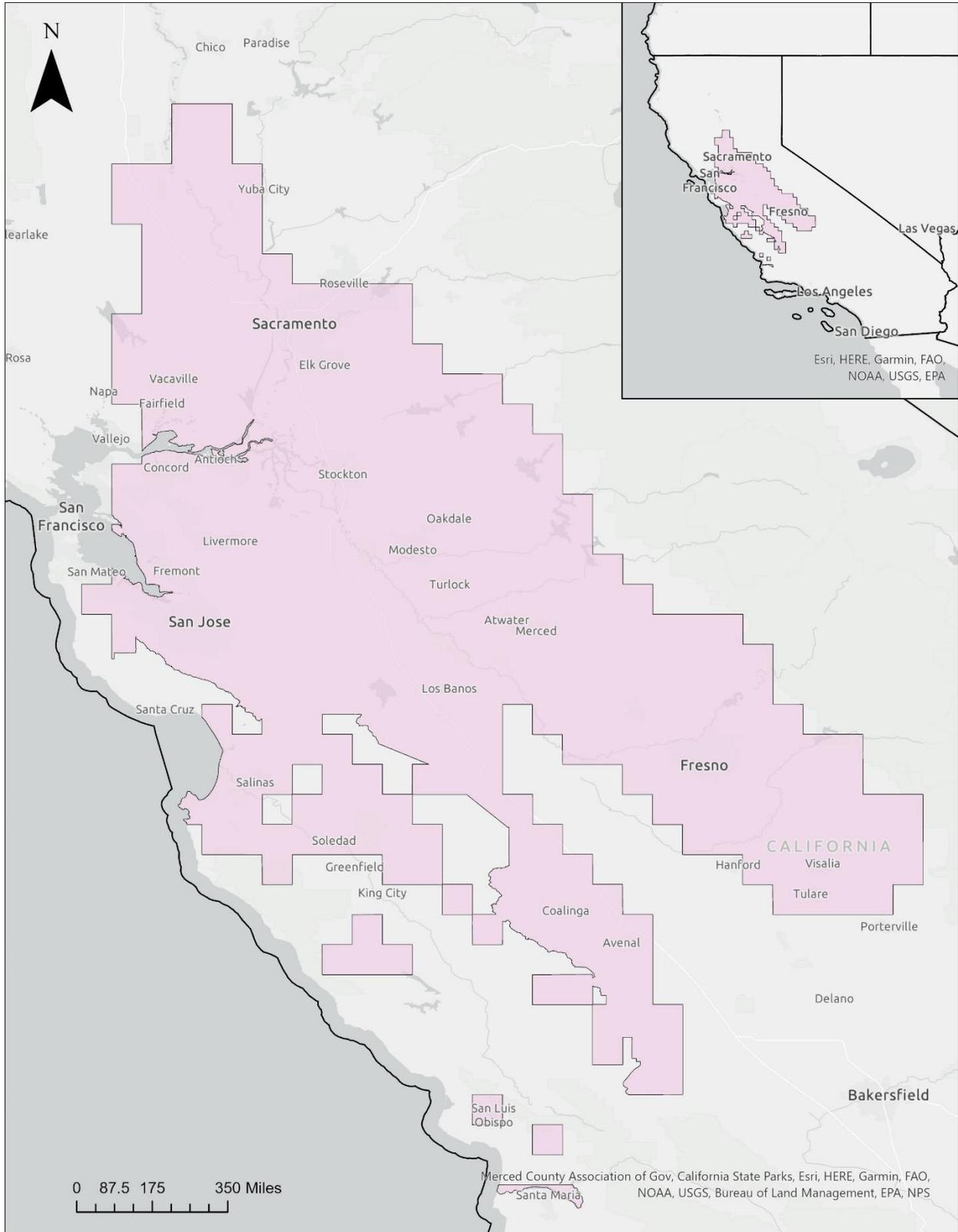


Figure 4. The range of the Central California tiger salamander (*Ambystoma californiense*).

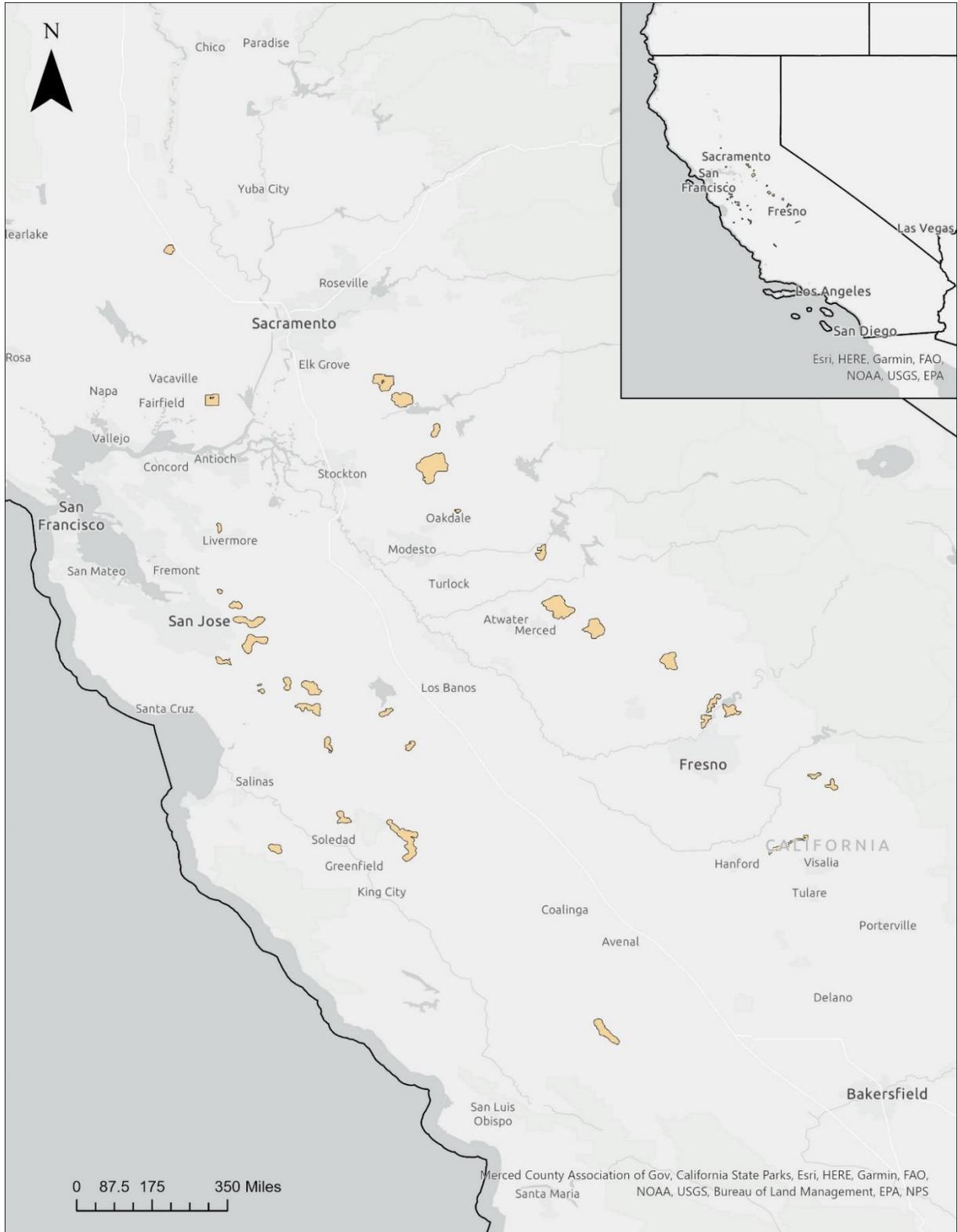


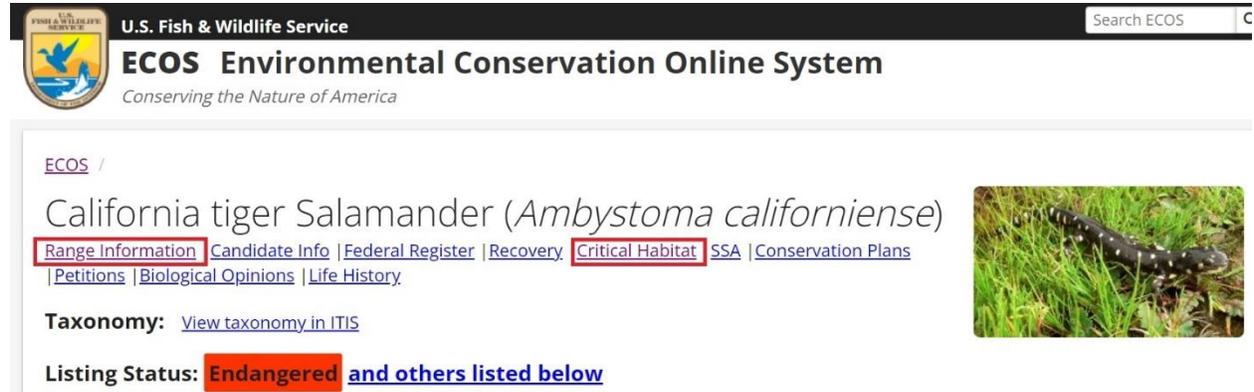
Figure 5. California tiger salamander (*Ambystoma californiense*) Central California Distinct Population Segment (DPS) Designated Critical Habitat Units.

Table 1: Links to Access Spatial Units for Pilot Species Ranges and Designated Critical Habitats

Species	Spatial Area	Link
Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)	Range	https://ecos.fws.gov/ecp/species/7850
Vernal Pool Tadpole Shrimp (<i>Lepidurus packardi</i>)	Range and Designated Critical Habitat	https://ecos.fws.gov/ecp/species/2246
California tiger salamander (<i>Ambystoma californiense</i>) Central California Distinct Population Segment (DPS)	Range and Designated Critical Habitat	https://ecos.fws.gov/ecp/species/2076

Guidance for growers to determine if their field(s) will be subjected to the proposed mitigation for listed species.

Since there are no draft bulletins available on Bulletins Live! Two for users to review, the Agency is providing guidance for users to determine if their field(s) would be impacted by the proposed mitigation so that they are better equipped to provide comments. Methomyl users can use links provided in third column of Table 1 (Appendix C) to access information on each species' biology, listing status, range and designated critical habitat, if defined. As an example, if one were to click on the link for [California tiger salamander](https://ecos.fws.gov/ecp/species/2076), the website shown in Figure 6 below appears. Visitors to the webpage will note that there are sections titled 'Range Information' and 'Critical Habitat' at the top of the webpage (red boxes in Figure 6). By clicking on 'Range Information,' the map in that section of the webpage shows the range of the species (Figure 7 below). Note in the upper lefthand corner, there is a zoom tool that allows individuals to zoom in on the map to determine if the area(s) to be treated is located within the salamander's range and subject to the mitigation described in this PID. If visitors to the webpage click on 'Critical Habitat' shown in Figure 6, they will be directed to a map for the designated critical habitat (Figure 8 below). Given that the areas of designated critical habitat are much smaller than the range, this exercise may be more valuable to determine if the area(s) to be treated is (are) located within the designated critical habitat because EPA is proposing that use of methomyl in designated critical habitat be prohibited. Figure 8 below also includes a zoomed in picture of a designated critical habitat to show the level of granularity the maps online are capable of providing.



The screenshot shows the ECOS (Environmental Conservation Online System) website for the California tiger salamander (*Ambystoma californiense*). The header includes the U.S. Fish & Wildlife Service logo and the text "U.S. Fish & Wildlife Service" and "ECOS Environmental Conservation Online System". Below the header, there is a navigation menu with links for "Range Information", "Candidate Info", "Federal Register", "Recovery", "Critical Habitat", "SSA", "Conservation Plans", "Petitions", "Biological Opinions", and "Life History". The "Critical Habitat" link is highlighted with a red box. Below the navigation menu, there is a "Taxonomy" section with a link to "View taxonomy in ITIS" and a "Listing Status" section with the text "Endangered and others listed below". A photograph of a California tiger salamander is shown on the right side of the page.

Figure 6. The ECOS website linked in Table 1 Appendix C for the California tiger salamander. Red boxes surrounding 'Range Information' and 'Critical Habitat' will direct website visitors to range and designated critical habitat maps featured in figures 7 and 8 below, respectively.

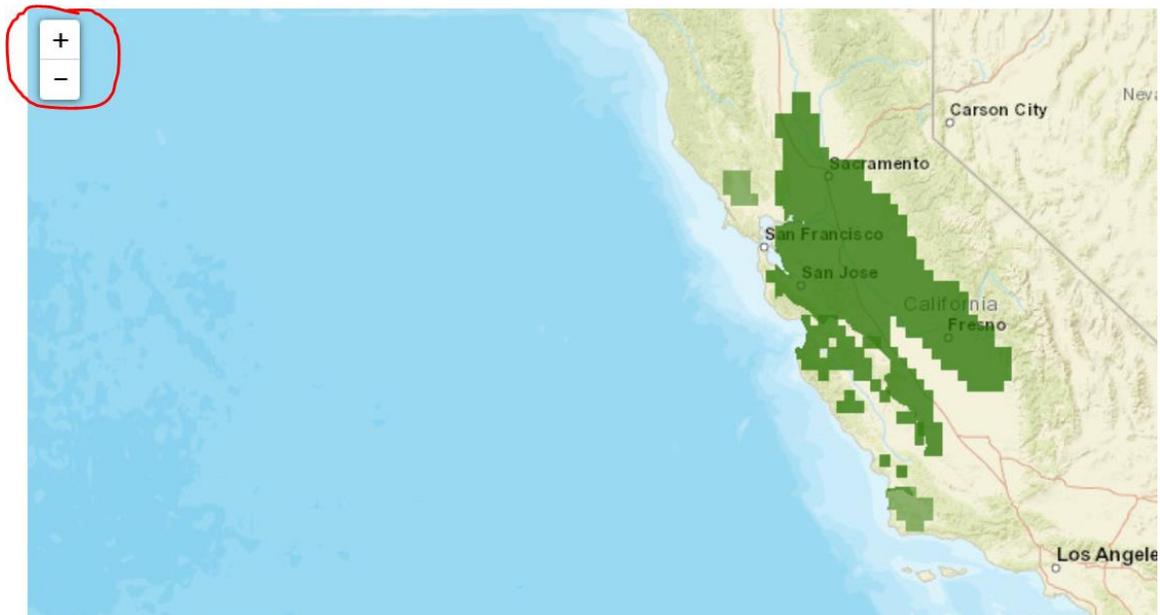


Figure 7. California tiger salamander range map.

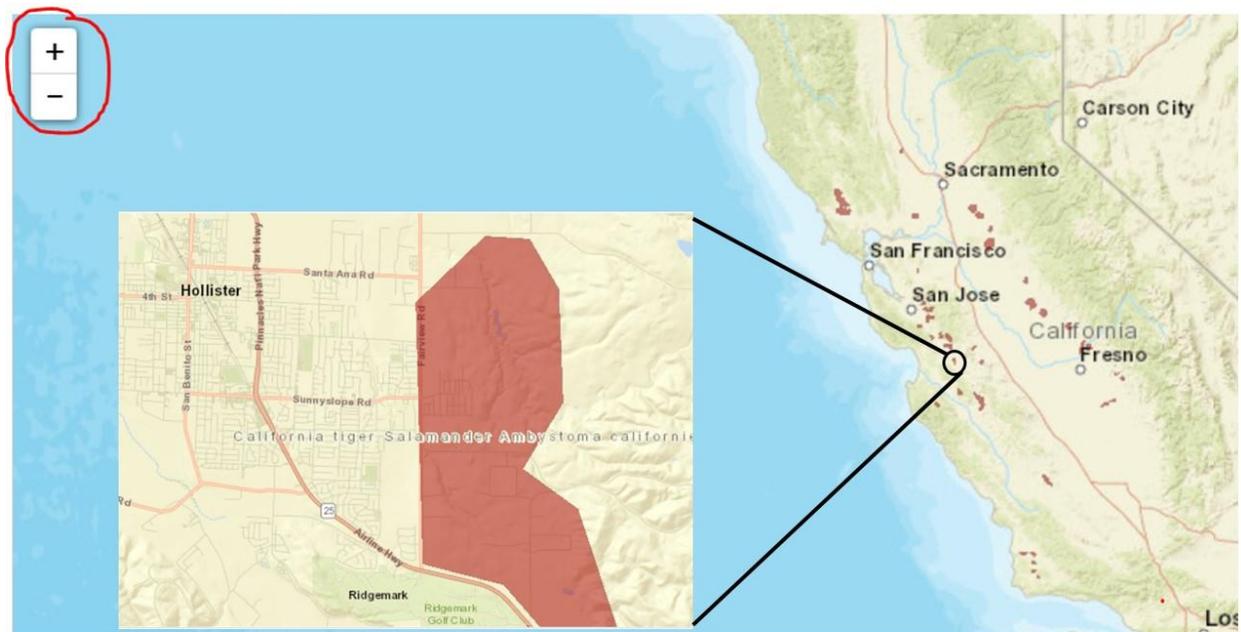


Figure 8. An overview of the California tiger salamander designated critical habitat. Inset map shows a close-up view of one of the constituent designated critical habitats.

Appendix D. Proposed Alternative Mitigation to Implement NMFS Salmonid Biological Opinion for Methomyl

Background

In April 2009, NMFS released a Biological Opinion specific to listed Pacific salmon and steelhead species for various pesticides, including methomyl. EPA is choosing to implement this BiOp as part of its registration review process. The Agency is proposing alternative Reasonable and Prudent Alternatives (RPAs) to those described in the 2009 NMFS BiOp for two reasons: 1) to account for the nationwide mitigation measures already negotiated with registrants as part of FIFRA registration review and 2) to align mitigation measures with NMFS' current approach for reducing pesticide loading in aquatic environments (hereafter referred to as 'NMFS point system'), as described in the most current biological opinion to the Agency⁴⁹. As noted in the Services' *Consultation Handbook*⁵⁰, action agencies (in this case, EPA) may choose to develop alternative RPAs, based on what they perceive is the best available scientific and commercial data. In addition, the action agencies (not the Services) are responsible for determining the validity of the alternative measures.

Estimated points needed to reduce environmental exposure to methomyl

For the purpose of developing alternative RPAs for methomyl, the Agency relied on the modeling that supports the final methomyl BE transmitted to the Services to initiate formal consultation. EPA compared the average 1-in-15 year daily average EECs in surface water with the methomyl toxicity endpoints specific to salmon species. The BE incorporates all current label uses and restrictions, including a 100 foot aerial and 25 foot ground buffer to waterbodies.

According to NMFS point system, the magnitude by which the EECs exceed the selected aquatic toxicity endpoints is an approximation of the amount of mitigation needed to reduce harmful exposure in the environment. NMFS assigns a pesticide an overall number of target points for runoff and drift reduction. Identified risk reduction options are given point values based on their effectiveness in reducing environmental loading from drift and runoff/drainage. Described below is the reasoning for the necessary environmental exposure reductions for methomyl and the proposed alternative mitigation measures to achieve the target points for drift and runoff reduction.

The single maximum application rate for agricultural uses of methomyl is approximately 1 lb AI/A. Based on the current label, this rate can be applied multiple times in a year. Modeled methomyl EECs were greater than the selected toxicity endpoints by a factor of 99 or greater for at least one methomyl use scenario at all application rates. Therefore, EPA chose the same number of target points for drift and runoff reduction as used by NMFS in its June 30, 2022 revised BiOp on chlorpyrifos, diazinon, and malathion (as these pesticides had similar EEC/toxicity endpoint relationships). Following NMFS point system, EPA modified the total number of target points needed based on application rate. Lower yearly application rates (< 13 lbs AI/A/year) require fewer target points than higher application rates \geq 13 lbs AI/A/year (see Table 1 below).

Table 1. Point requirements by application rate (applies to aerial, airblast and ground applications)

Application rate	Runoff points	Drift points
>13lbs AI/A/year	80	80
<13 lbs AI/A/year	15	15

Proposed mitigation to reduce exposure to listed salmon and steelhead species

Mitigation measures proposed in the 2020 PID for methomyl were not accounted for in the 2009 NMFS

⁴⁹ See p. 131 at <https://www.fisheries.noaa.gov/resource/document/biological-opinion-chlorpyrifos-diazinon-and-malathion>

⁵⁰ See pp. 47-48, <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

BiOp. Drift mitigation language proposed in the 2020 PID, including wind speed restrictions, droplet restrictions, and release height restrictions, account for 15 drift points in the NMFS point system. When the proposed FIFRA mitigations from the 2020 PID are considered, users applying 13 lbs AI/A/year or less would require an additional 15 runoff points to achieve the runoff reduction target needed to implement the 2009 BiOp. Runoff reduction statements prohibiting application to saturated soils or when rainfall is forecasted equates to 30 runoff points in the NMFS point system and would, therefore, satisfy the necessary points to address the BiOp (for users using ≤ 13 lbs AI/A/year). Specific mitigation language instructs users not to apply pesticide products when the soil is saturated or above field capacity, or when a storm event likely to produce runoff from the treated area is forecasted by NOAA/NWS to occur within 48 hours following application.

In this proposed revision to the PID, EPA is proposing a maximum annual application rate for methomyl of 13 lbs AI/A/year and rain/runoff reduction language⁵¹ (See section IV). EPA concludes that with this proposed mitigation for methomyl, the Agency is able to predict that there is not a likelihood of jeopardy to listed salmon and steelhead species or adverse modification of their designated critical habitat.

⁵¹ “Do not apply this product when soil is saturated or above field capacity.
Do not make applications during rain.

Do not apply when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application.
Excessive rainfall within 48 hours after application may cause unintended run-off of pesticide application.”