

## **EXECUTIVE SUMMARY**

This draft Biological Opinion (Opinion) evaluates the effects of the Environmental Protection Agency's (EPA's) proposed national registration review of carbaryl on endangered and threatened species and designated critical habitat under U.S. Fish and Wildlife Service (Service) jurisdiction, in accordance with section 7(a)(2) of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.). This Opinion also serves as a conference report for proposed species and proposed critical habitats.

Carbaryl is used on a wide variety of terrestrial food and feed crops, as well as uses in turf management, ornamental production, rangeland, and residential settings. Additionally, carbaryl is used to thin fruit in orchards to enhance fruit size and enhance repeat bloom. Carbaryl is also used to control mud and ghost shrimp and in commercial shrimp ponds in Texas. There are currently two technical registrants of carbaryl that are considered applicants in this consultation, Tessenderlo Kerley Inc. (TKI), with 61 active product registrations for use on agriculture (60 Section 3 general registrations under FIFRA and 1 24c Special Local Needs registration under FIFRA), and Drexel, which holds registrations for non-agricultural uses. Carbaryl can be applied in liquid (i.e., flowable concentrate, emulsifiable concentrate, wettable powder, water soluble powder), bait, granular, or dust forms. Aerial and ground application methods are allowed, as are pressure sprayers, dust applicators, spreaders and shank applicators, and baits.

### **Key Findings**

Our analysis of the effects of the action considered the information on the carbaryl label and supplemental information that we received from EPA and TKI. In this Biological and Conference Opinion, we addressed 1,176 candidate, proposed, and listed species and 479 designated and proposed critical habitats. EPA also requested concurrence with their determinations that the proposed action may affect, but is not likely to adversely affect, 66 listed species and 20 designated and proposed critical habitats. EPA determined there would be no effect from the proposed action, and we adopted this call for 417 listed and proposed species and 377 designated and proposed critical habitats. In an associated Concurrence Appendix, we described our concurrence and agreement with EPA's not likely to adversely affect and no effect determinations. We also explained our reasonings behind including two species (i.e., Great Lakes piping plover and desert tortoise) in our Biological Opinion instead of the concurring with EPA's "not likely to adversely affect" determinations for the species.

### **Analysis and Methods**

We followed an ecological risk assessment framework to determine effects to species and their critical habitats. We used information presented in EPA's Biological Evaluation (BE) (e.g., pesticide exposure estimates and toxicological response data) and from TKI, when applicable, to predict the resulting effects to species and critical habitats. We assessed anticipated toxicological effects related to the Action, including anticipated general pathways of exposure to listed species taxa groups and their designated critical habitats (i.e., physical and biological features, or PBFs). We then describe specific aspects of methomyl (e.g., chemical properties, applications rates, routes of exposure), its use on the landscape (e.g., different types of usage data), and how it will impact species and critical habitats based on these properties. We describe factors that influence

exposure and effects and how we incorporated them into our analysis. Within the Integration and Synthesis section of the Opinion, we describe our approach to the analysis for each of the taxa groups, which includes incorporating all aspects of the potential exposure to methomyl for the different taxonomic groups within the context of the status of the species and critical habitat, environmental baseline, and cumulative effects.

For species that EPA determined were “likely to be adversely affected” by the proposed action or that the EPA determined were “not likely to be adversely affected” and we did not concur, we assessed the species’ overall vulnerability and conducted a risk analysis. The risk analysis included metrics of exposure and expected magnitude of adverse effects. We used the percent overlap between the species’ ranges and the action area (i.e., methomyl use sites and areas of off-site transport through spray drift or runoff). When available, we used metrics for past insecticide usage (i.e., U.S. Department of Agriculture’s Census of Agriculture, CoA; and California’s Department of Pesticide Registration’s California Pesticide Use Report, CalPUR) and estimated carbaryl usage (i.e., EPA’s National and State Summary Use and Usage Matrix, SUUM) to assess potential future exposure to carbaryl. Finally, we compared estimated environmental concentrations that EPA generated to reference toxicity thresholds to determine what expected magnitude of adverse effects to individuals and necessary resources, including critical habitat PBFs when applicable. Depending on the species, toxicological effects could be mortality, growth inhibition, reproduction loss, reduction in habitat, or prey loss. We used these pieces of information to generate the anticipated risk of adverse effects for each species considered in this Opinion.

Our Opinion includes analyses and conclusions for the species for which EPA provided determinations in the final BE and subsequent correspondence. Some additional species have been listed and critical habitats have been designated for which we do not have EPA’s determinations or the other information needed for our analyses. We intend to work with EPA to address these species and designated critical habitat in our final Opinion.

## **Results**

### *Animals*

In total, we considered 604 candidate, proposed, and listed animals and 297 proposed and designated animal critical habitats in our Opinion that either EPA determined were likely to be adversely affected by the proposed action or that the EPA determined were “not likely to be adversely affected” and we did not concur. We expect direct adverse effects to animals if they occur on carbaryl use sites or consume contaminated food items. We expect relatively high levels of mortality for aquatic and terrestrial invertebrates where exposure occurs. For other taxa groups, we expect variable levels of mortality, sublethal, and indirect effects based on their life history, food base, and other considerations. For more detail, see the *Effects of the Action on Animals* section of the Opinion. After considering the extent of exposure, magnitude of expected impacts to individuals and their resources, vulnerability analysis, environmental baseline, and cumulative effects, we concluded that the proposed action poses a high risk of adverse effects and is likely to jeopardize 29 proposed or listed animal species. After assessing the extent of exposure and magnitude of effects to PBFs, we found that the proposed action poses a high risk

of adverse effects and is likely to destroy or adversely modify 11 designated critical habitats for animal species.

### *Plants*

In total, we considered 572 listed plants and 182 proposed and designated plant critical habitats in our Opinion that either EPA determined were likely to be adversely affected by the proposed action or that the EPA determined were "not likely to be adversely affected" and we did not concur. We expect effects to plants will occur for those that rely on pollinators or dispersers, primarily invertebrates. We do not expect effects to plants directly, and we do not anticipate any appreciable reductions in the availability of mammalian or avian pollinators or seed dispersers. After considering the extent of exposure, magnitude of expected impacts to individuals and their resources, vulnerability analysis, environmental baseline, and cumulative effects, we concluded that the proposed action poses a high risk of adverse effects and is likely to jeopardize 49 listed plant species. After assessing the extent of exposure and magnitude of effects to PBFs, we found that the proposed action poses a high risk of adverse effects and is likely to destroy or adversely modify three designated critical habitats for plant species.

### **Conclusions**

Based on our analysis of listed species and designated critical habitats considered in this Opinion, which combines a vulnerability and risk analysis with the species' environmental baseline and cumulative effects, we conclude that the proposed action is likely to jeopardize 78 proposed or listed species and destroy or adversely modify 14 proposed or designated critical habitats. For other listed species and designated critical habitats, we expect exposure to carbaryl and adverse effects to occur at low magnitudes. We do not expect significant population-level effects are likely for these species. This draft opinion does not incorporate additional mitigation or conservation measures put forward by the EPA or technical registrants beyond what has already been committed to through the 2022 Proposed Interim Decision or the 2024 National Marine Fisheries Service biological opinion on carbaryl. We will work with EPA and the applicants for carbaryl prior to issuing a final biological opinion to develop technologically and economically feasible conservation measures and any required Reasonable and Prudent Alternatives or Measures (following the mitigations laid out in EPA's draft Insecticide Strategy) tailored to the needs of the species and critical habitats where applicable.