UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

PESTICIDE ACTION NETWORK NORTH AMERICA, et al.,

Plaintiffs,

v.

MARTHA WILLIAMS, et al.,

Defendants.

Case No. 24-cv-06324-JSC

ORDER RE: CROSS-MOTIONS FOR SUMMARY JUDGMENT

Re: Dkt. Nos. 58, 70, 73

Plaintiffs challenge a 2022 Biological Opinion issued by the United States Fish and Wildlife Service ("the Service") regarding the nationwide effects of a pesticide, malathion, on endangered species and their critical habitats. (Dkt. No. 1.)[1] Plaintiffs are three advocacy organizations: Pesticide Action Network of North America ("PANNA"), the Center for Biological Diversity ("CBD"), and the Center for Food Safety ("CFS"). Defendants are the Service and its director, Martha Williams. Intervenor-Defendant Croplife America, a national trade association that represents the pesticide industry's interests, intervened as a matter of right. (Dkt. No. 40.) Plaintiffs bring six causes of action. All allege the Service's biological opinion violates the Administrative Procedure Act and the Endangered Species Act. (Dkt. No. 1.) Before the Court are the parties' cross-motions for summary judgment. (Dkt. Nos. 58, 70, 73.)

For the reasons set forth below, the Court grants in part and denies in part each motion. Plaintiffs have standing to challenge the biological opinion's determinations regarding species jeopardy and critical habitat, including the failure to consider recovery, the "usage" analysis, and the categorization scheme underlying those determinations. The biological opinion's jeopardy

[1] Record citations are to material in the Electronic Case File ("ECF"); pinpoint citations are to the ECF-generated page numbers at the top of the documents.

determinations are arbitrary because the "usage" analysis underlying every determination relies on arbitrary species' range estimates and/or pesticide usage data. Additionally, all Category 2 critical habitat determinations and the subset of Category 1 determinations that have rationales saying there are "no relevant" physical and biological features are arbitrary because the Service's path in making category determinations cannot reasonably be discerned. The Court grants summary judgment in favor of Defendants and Intervenor-Defendants with respect to Plaintiffs' claim the opinion failed to consider recovery of critical habitats.

The Court does not reach the parties' remaining arguments. Because the jeopardy determinations are arbitrary due to the "usage" analysis, and that analysis likely will be revisited, the Court does not address Plaintiffs' argument the jeopardy determinations fail to address recovery, or that the critical habitat determinations improperly apply pesticide usage data. Additionally, the Court does not address Plaintiffs' claims regarding incidental take because an Incidental Take Statement is required only when an opinion makes "no jeopardy" or "no adverse modification" findings, 16 U.S.C. § 1536(b)(4), and those findings are arbitrary. Finally, the Court orders the parties to meet and confer to propose a remedy that is consistent with this Order.

STATUTORY FRAMEWORK: THE ENDANGERED SPECIES ACT

A. Species and Critical Habitats

The Endangered Species Act ("ESA") affords "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." 16 U.S.C. § 1531(b). The law requires the Service to maintain a list of threatened and endangered species. *Id.* § 1533(a)(3)(A)(i). An "endangered" species is one "in danger of extinction throughout all or a significant part of its range." *Id.* § 1532(6). And a species is "threatened" if it is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* § 1532(20)). A species may be listed as endangered or threatened "because of any of" five enumerated factors, one of which is "the present or threatened destruction, modification, or curtailment of its habitat or range." *Id.* § 1533(a)(1)(A).

Once a species is listed as endangered or threatened, the Service "shall[] concurrently" publish a regulation which "designate[s] any habitat of such species … considered to be critical

habitat." *Id.* § 1533(a)(3)(A)(i). The ESA does not have a "baseline definition of habitat–it identifies only certain areas that are indispensable to the conservation of the endangered species. The definition allows the Secretary to identify the subset of habitat that is critical, but leaves the larger category of habitat undefined." *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 586 U.S. 9, 20–21 (2018). The law defines "critical habitat" as "areas occupied by the species 'on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection,' as well as unoccupied areas that the Secretary determines to be 'essential for the conservation of the species.'" *Id.* at 20 (quoting 16 U.S.C. § 1532(5)(A)). "Habitat can, of course, include areas where the species does not currently live, given that the statute defines critical habitat to include unoccupied areas." *Id.* at 21.

"[A]t the heart of the critical habitat designation" are the "physical or biological features essential to the species." *Alaska Oil & Gas Ass'n v. Jewell*, 815 F.3d 544, 555 (9th Cir. 2016) (quoting 50 C.F.R. § 424.12(b)(5)). These physical or biological features, known as PBFs, "include, but are not limited to, the following: roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types." *Alaska Oil*, 815 F.3d at 555 (citing 50 C.F.R. § 424.12(b)(5)). In other words, a habitat is considered "critical" for a species *because* it has these "essential" features. If these features are "[k]nown" to the Service, they "shall be listed within the critical habitat description" and the Service must "determine where, within the [species'] occupied range, the … features … are found." *Alaska Oil*, 815 F.3d at 555.

B. Section 7 Consultation

Section 7 of the ESA requires federal agencies, in consultation with the Service, to ensure "any action authorized" by the federal agency "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of the species' designated critical habitat. 16 U.S.C. § 1536(a)(2). "In fulfilling th[is] requirement[, …] each agency shall use the best scientific and commercial data available." *Id.*

Section 7 proscribes a process by which consultation occurs between the agency proposing the action and the Service.[2] The requirement for interagency consultation is triggered when the so-called action agency "has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species." *Id.* § 1536(a)(3). Once formal consultation begins, the action agency first requests from the Service information regarding whether an endangered species "may be present in the area" of the proposed action. *Id.* § 1536(c)(1). The Service then responds to the action agency's request. If the Service "advises … that such species may be present," then the action agency "shall conduct a biological assessment" to identify species "likely to be affected by such action." *Id.*

Once consultation concludes, the Service must publish a biological opinion. The Service's opinion is a "written statement setting forth the [Service]'s opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat." *Id.* § 1536(b)(3)(A). In sum, the Service's biological opinion answers the question: is the proposed action "likely to jeopardize the continued existence of" listed species "or result in the destruction or adverse modification of habitat of such species"? *See id.* §§ 1536(a)(2), (b)(3)(A). "The [biological opinion] should address both the jeopardy and critical habitat prongs of Section 7 by considering the current status of the species, the environmental baseline, the effects of the proposed action, and the cumulative effects of the proposed action." *Gifford*, 378 F.3d at 1063 (citing 50 C.F.R. § 402.14(g)(2)-(3)). The opinion's inquiry is different from the inquiries earlier in consultation. During consultation, the action agency opines whether species and habitats are "likely to be ***affected***" by an action, *id.* § 1536(c)(1) (emphasis added), whereas after consultation, the consulting agency opines about the action's likelihood to "jeopardize" a species and the "destruction or adverse modification" of critical habitat. *See id.* §§ 1536(a)(2),

[2] "For ESA consultation on freshwater or land-based species[…] the consulting agency is the [Fish and Wildlife Service]. For marine or anadromous species, the consulting agency is the National Marine Fisheries Service[.]" *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1063 n.1 (9th Cir. 2004), *amended*, 387 F.3d 968 (9th Cir. 2004) (citing 50 C.F.R. § 402.01).

(b)(3)(A).

Depending on what the Service concludes with respect to jeopardy and critical habitat, Section 7 requires the biological opinion to set forth other information. "If jeopardy or adverse modification is found, the [Service] shall suggest those reasonable and prudent alternatives which [it] believes would not violate subsection (a)(2) and can be taken by the Federal agency or applicant in implementing the agency action." *Id.* § 1536(b)(3)(A). By contrast, if the Service concludes there will be "no jeopardy" to a species or "no adverse modification" to a habitat, the Service must assess, in writing, the impacts of incidental take on the species, called an Incidental Take Statement. As Section 7 explains more fully:

> If after consultation under subsection (a)(2), the Secretary concludes that—
>
> > (A) the agency action will not violate such subsection, or offers reasonable and prudent alternatives which the Secretary believes would not violate such subsection;
> >
> > (B) the taking of an endangered species or a threatened species incidental to the agency action will not violate such subsection; and
> >
> > (C) if an endangered species or threatened species of a marine mammal is involved, the taking is authorized pursuant to section 1371(a)(5) of this title;
>
> the Secretary shall provide the Federal agency and the applicant concerned, if any, with a written statement that—
>
> > (i) specifies the impact of such incidental taking on the species,
> >
> > (ii) specifies those reasonable and prudent measures that the Secretary considers necessary or appropriate to minimize such impact,
> >
> > (iii) in the case of marine mammals, specifies those measures that are necessary to comply with section 1371(a)(5) of this title with regard to such taking, and
> >
> > (iv) sets forth the terms and conditions (including, but not limited to, reporting requirements) that must be complied with by the Federal agency or applicant (if any), or both, to implement the measures specified under clauses (ii) and (iii).

Id. § 1536(b)(4).

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C. The Scope of the Consultation at Issue

The consultation here was "vastly more complex than what is often considered a more typical section 7 consultation." AR-1522. Typically, a section 7 consultation is "carried out on a finite project in a localized geographic area, such as repairing a bridge or building a new road," and therefore involves only "a handful of listed species[.]" *Id.* Here, however, the Service defined the "agency action" as the Environmental Protection Agency's ("EPA") re-registration of pesticide products containing malathion for nationwide use, and evaluated the effects of malathion according to all of its labeled uses. AR-12303. Thus, the scope of the action included "over 100 different registered uses throughout the U.S." which required the Service to "evaluate the likelihood of effects to over 1,500 listed species and 600 designated critical habitats." AR-1522.

Nonetheless, the EPA and the Service followed the typical chronology proscribed under Section 7. The EPA was first required to ask the Service whether any endangered species was in the area affected by this agency action, and the Service essentially answered "yes," because the area is the entire United States. *See* 16 U.S.C. § 1536(c)(1); AR-12260. Then, in 2017 the EPA provided a "Biological Evaluation" in which it assessed which species and habitats were "likely to be affected" by malathion. AR-12285, 12289. Ultimately, after roughly five years of further consultation, the Service's final biological opinion made determinations with respect to jeopardy of species and adverse modification of habitats. AR-12260.

The final biological opinion concluded malathion's registration "is not likely to jeopardize listed species or destroy or modify their critical habitats"–that is, universal "no" findings under both prongs. *Id.* Under Section 7, this finding meant the biological opinion needed to include an Incidental Take Statement. *See* 16 U.S.C. § 1536(b)(4). The biological opinion did so; the Incidental Take Statement is eight pages and outlines exactly one "reasonable and prudent measure" to minimize the impacts of incidental take and four terms and conditions to implement that measure. AR-12581-89. The opinion then listed 10 conservation recommendations, which span a page and a half and are generally applicable to all species. AR-12591-92.

RELEVANT CONSULTATION HISTORY

While completing the malathion consultation, the Service encountered "novel policy and

procedural challenges" while juggling "competing priorities" regarding "other complex national consultations" and "other upcoming pesticide registrations, some of which also have litigation-related deadlines." AR-1525. The biological opinion provides a timeline of interagency consultation between 2010 and the publishing of the opinion in 2022. AR-12288-91. The Court summarizes key events and decisions below.

A. The Recommended Three-Step Consultation Approach

In 2010, the EPA, the Service, the National Marine Fisheries Service ("NMFS"), and the U.S. Department of Agriculture ("USDA") jointly sought guidance from the National Academy of Sciences on nationwide pesticide consultations. AR-12286. In particular, the agencies asked for "advice on a range of subjects related to risk assessment," including "identifying best available scientific data and information," "considering sublethal, indirect and cumulative effects" of pesticides on species, "using models to assist in analyzing the effects of pesticide use," "incorporating uncertainties," and "using geospatial information and datasets." AR-12286-87. In 2013, the National Academy of Sciences issued a report with recommendations. AR-12287; *see* AR 162-355 (the report).

The overarching recommendation was a "three-step risk assessment and consultation approach," which the agencies implemented for the consultation here. AR-12287. In step one of this approach, the recommendation was to "identif[y] which species and critical habitats have the potential to be affected by the proposed action." AR-43019. As the EPA later described:

> Step 1 consists of two parts: 1) establishing the action area for the proposed action, and 2) overlaying the species ranges and critical habitat designations onto the action area to determine which species and critical habitats overlap with the uses as allowed by the labels. This step identifies which species and critical habitats have the potential to be affected by the proposed action (warranting a "may affect" determination), and which species would not be affected by the stressors of the proposed action (e.g., no overlap, and thus warranting a "no effect" determination). […] Any species and/or critical habitat that warrants a "may affect" determination in Step 1 continues for further analysis in Step 2.

AR-42662. Step two would be a "similar" but more detailed evaluation in which the EPA determines whether malathion's registration was "likely" or "not likely to adversely affect … listed species and/or designated critical habitats[.]" AR-42670 (cleaned up). Finally, the Service

would perform step three, which is to determine, in a published biological opinion, whether malathion's registration is "likely to jeopardize listed species and/or adversely modify or destroy designated critical habitat." AR-42662.

The National Academy of Sciences also made recommendations regarding data collection and analysis. To implement the ESA's "best available data" requirement, the report stated "some guidelines … need to be followed" for the biological opinion to have a "credible assessment." AR-186. "To ensure that the best data available are used, screen the data first for relevance," *i.e.*, verify "the applicability of the data for the intended purpose." *Id.* (cleaned up). For instance, "[i]nformation that is not relevant clearly should not be used in assessing risk[,]" "there should be a reasonable theoretical basis for data extrapolation," and "[t]he data should also be applicable to the locations being considered." *Id.* Additionally, the agencies need to "document the evaluation of all data used with particular attention to sources, relevance, and quality[.]" AR-187. Another recommendation regarding "pesticide application rates" stated:

> Pesticide application rate is another important source of uncertainty. Despite a label's explicit application specifications, such as 1 lb of material per acre for corn fields, users commonly apply lower quantities according to the severity of their weed or pest infestation. However, Steps 1 and 2 of the ESA process (Figure 2-1) should ensure that no potentially unsafe pesticide applications are ignored. Accordingly, an exposure modeler can only assume that a given pesticide is applied at the maximum allowable rate. Furthermore, in Step 3 of the process […] the Services cannot reasonably be expected to use information that suggests that substantially lower application rates are used unless supporting data are available. Such data must include statistical descriptions of the spatially and temporally distributed application rates.

AR-249 (cleaned up) (emphasis added).

B. The EPA's Biological Evaluation Implements Steps One and Two

On January 18, 2017, the EPA submitted a "Biological Evaluation" to the Service, which contains the EPA's analysis for steps one and two. AR-12285, 12289. As explained below, the Service's final biological opinion directly incorporates the Biological Evaluation's methods at times. As relevant here, for both steps, the EPA input various "spatial datasets" in a Geographic Information System ("GIS") software tool known as "ArcGIS." AR-42661-64; 42974. Using this software, the EPA essentially created a map which overlays three "layers" of data: the action area,

species' locations, and critical habitat locations. *See* AR-42661-69. The EPA mapped these "layers" on top of one another, then identified whether expected pesticide use "co-occurs" with the locations of listed species and/or their critical habitats. *See id.*

For the first map layer, the EPA defined the "action area" as "the actual and potential use of the pesticide and areas where that use could result in effects." AR-42663. So, the action area layer on the map spatially "represents the application site[s] for [malathion's] agricultural and non-agricultural label uses." AR-42664. The EPA visualized this layer by inputting the "best available" datasets into its GIS software. *Id.* Agricultural uses of malathion were represented by a "land cover dataset" produced by the USDA and county-level data from the National Agricultural Statistics Services' Census of Agriculture. *Id.* Non-agricultural uses of malathion, which "include a wide range of … categories," were "represented by the best available land cover data," namely the "National Land Cover Dataset" and other "appropriate" data sources. *Id.* In Attachment 1-3 of the Biological Evaluation, the EPA explains its methods for creating this map layer, including a description of all datasets used, the EPA's refinements to those data, and a full reprinting of the code the EPA used. *See* AR-43031-70.

The other two map layers represent the locations of listed species and their designated critical habitats. These locations were contained in "GIS spatial file[s]," "all" of which "were provided by" the Service and the NMFS. AR-42668. As the EPA described its process of obtaining files for species' locations:

> The [Service] requested from the species experts in their Regional and Field Offices the most refined range data (e.g., sub-county level data where possible) for all listed species under their jurisdiction. NMFS provided [GIS] maps for its species. The species ranges were provided in the form of a GIS spatial file[. …] (see **ATTACHMENT 1-6** for details).

Id. (bold in original). And for critical habitat locations:

> The [Service] and NMFS provided tables of species with designated critical habitat and the corresponding location files on their respective websites. All available critical habitat location files were downloaded from the NMFS Regional websites and the ECOS Portal (http://ecos.fws.gov/crithab). For those not available on the ECOS Portal, critical habitat location files were received directly from the Services.

AR-42668-69.

Once the EPA obtained these files and input them into its ArcGIS software, the agency performed a "co-occurrence analysis." AR-42669. The EPA describes the "co-occurrence analysis" as using the ArcGIS software's "Zonal toolbox" to "overlay[] the species location files received from the Services with the action area file(s) and us[ed] the ArcGIS Zonal Statistics tool to count the number of action area pixels found within overlapping species location features." *Id.* "If a species or its designated critical habitat co-occurs with the action area, this species receives a 'May Affect' determination." *Id.* In simpler terms, under its step-one analysis, the EPA determined malathion "may affect" a species if the EPA's map showed *any* geographic overlap between expected pesticide use and either the species' range or its critical habitats. *See id.*; AR-42974. If there was no overlap for a species, "the call will be 'No Effect' and no further analyses will be required (*i.e.*, there is no need for Steps 2 and 3)." AR-42669; *see* AR-42974. In total, the EPA made a "may affect" determination for 1,819 species and 794 critical habitats, and a "no effect" determination for 16 species and zero habitats. AR-42973.

The EPA then proceeded to Step 2 to determine whether malathion is "likely to adversely affect" listed species and critical habitats. AR-42670. The step-two determinations followed a two-part sequence. First, the EPA "use[d] the results from the Step 1 analysis to calculate the percent overlap of the species range or its designated critical habitat with each use site included in the action area[.]" AR-42974. "To calculate the percent overlap, the total use site acres is divided by the total acres of the species range occurring within the spatial extent of the use site." *Id.* "A 'Not Likely to Adversely Affect' determination [was] made for those species and/or designated critical habitats for which … overlap is less than 1%." AR-42975.

For species and critical habitat with greater than 1% overlap, the EPA proceeded to a "weight-of-evidence … analysis … to make effects determinations." AR-42976. Here, the EPA categorized animals and plants by taxonomic group. Animal species had eight groupings: birds, mammals, reptiles, terrestrial-phase amphibians, aquatic-phase amphibians, fish, aquatic invertebrates, and terrestrial invertebrates. *See* AR-42687; 42972. Plant species had three groupings: aquatic, terrestrial, and wetland. *See id.* Within each grouping, the EPA assessed

malathion's "risk" to listed species based on "general lines of evidence relevant to all listed taxa and their designated critical habitats," in addition to "[m]ore specific lines of evidence, relevant to particular listed species or designated critical habitats, … depending on the available information." AR-42671. Specifically, the EPA analyzed scientific literature about malathion's "direct effects" on species' "mortality," "growth," "reproduction," "behavior," and "sensory function," as well as malathion's "indirect effects" on species' "prey base, habitat, pollinators, etc. at expected concentrations" of pesticides. *See* AR-42671-77. Using a "weight-of-evidence [] approach" to evaluate these lines of evidence, the EPA answered "the question: Do we expect that effects to individuals of a listed species or its designated critical habitat exposed to malathion (according to registered labels) will not be discountable, insignificant, or completely beneficial?" AR-42678.

Some species, however, received separate "qualitative analyses," rather than a weight-of-evidence analysis, because the latter approach lacked "methods … to adequately estimate" these species' "potential exposures" to malathion. AR-42977. The species that received separate qualitative analyses "live exclusively … or primarily … in marine environments" (*i.e.*, sea turtles, whales, deep sea fish, sharks, marine mammals); "are cave-dwelling invertebrates" (*e.g.*, some spiders and beetles); or are affected by malathion's uses for mosquito adulticide (*i.e.*, 13 bird species). AR-42977-43018.

Ultimately, the EPA's Biological Evaluation made a "likely to adversely effect" determination for 1,778 species and 784 critical habitats, and a "not likely to adversely affect" determination for 41 species and 10 habitats. AR-12260; 42973. Subsequently, it became the Service's responsibility to make determinations regarding jeopardy to species and adverse modification or destruction to critical habitats. *See* 16 U.S.C. §§ 1536(a)(2), (b)(3)(A), (c)(1); AR-12287; 42662.

C. The Service Performs a Revised Effects Analysis to Identify Where Malathion's Usage is "Reasonably Certain to Occur"

During review of the EPA's Biological Evaluation, the Service "determined it was necessary to search for, gather, and compile data to inform both use and usage" of malathion. AR-12289. The Service asked the EPA to prepare a "revised effects analysis" "regarding actual use"

of malathion, "including extrapolation to areas where actual use data does not exist or cannot be obtained." AR-356 (letter from the Service to the EPA). In addition to the request for "extrapolation," the "revised effects analysis" would "eliminate[] from analysis geographic areas … where these pesticides are not used and where such use is not likely during the time period." *Id.* The Service's request quotes a regulation defining "effects of the action" to mean effects which "are reasonably certain to occur." AR-356-57 (quoting "50 C.F.R. 402.02"). In other words, the revised effects analysis is the agencies' attempt to identify, through a process of extrapolation and elimination, the areas where malathion's application is "reasonably certain to occur." The EPA agreed to conduct a revised analysis and to provide additional data on the use and usage of malathion. These data were the focus of several highlighted meetings, working groups, and briefings between February 2017 and August 2019. AR-12289-90.

The Service's revised effects analysis incorporated several data sources for pesticide usage that were not included in the EPA's Biological Evaluation. These data came from a proprietary source, Kynetec, and nine state departments of agriculture. AR-12409. Of these sources, only California's data (known as "CalPUR") was "robust." AR-12417. The remaining usage data had significant limitations because the data was from the years 2011 to 2015, "designed to address market questions," "nationwide" in scope, "lack[ed] the statistical foundation to understand the robustness at the state level of any geographic specificity at the sub-state level," did not provide enough information or "standards … to determine an adequate sample size," and only examined a "subset" of crops and malathion uses. AR-12409-10. Although these limitations created "particularly high uncertainty" and the Service was "unable to evaluate how representative these data are of past usage in these states," the Service nonetheless made conclusions about the usage of pesticides based on the data. AR-12415. For example, the Service "took any reported usage as positive evidence that malathion had been applied." *Id.* The Service's methods and approach to evaluating this data are explained more fully below.

D. The Service Publishes a Draft Biological Opinion, Then a Final Version

In April 2021, the Service transmitted a draft biological opinion to the EPA, which the EPA published for public comment. AR-12290. With its revised analysis of pesticide usage data,

and other factors explained below, the draft concluded the registration for malathion would likely jeopardize 78 species and adversely affect critical habitat of 23 species. AR-12260 n.3. The final biological opinion refers to the 2021 draft's conclusions as "preliminary findings." AR-12260. After the 2021 draft was published, the Service "worked with EPA, the registrants [of malathion], and USDA, to identify additional information and conservation measures[.]" *Id.* The Service developed conservation measures tailored to 64 species and a set of conservation measures generally applicable to all listed species. AR-12670-12301. In response to the 2021 draft's findings, the EPA modified the proposed agency action to incorporate those conservation measures into the label of malathion. AR-12660.

On February 28, 2022, the final biological opinion was released. The EPA's changes to the proposed action explicitly justified the final biological opinion's universal "no jeopardy" and "no destruction/adverse modification" findings: because those "new conservation measures [are] incorporated in EPA's Action and reflected in changes to the label language, [the opinion] **now** find[s] that the action is not likely to jeopardize" any species or "adversely modify" any critical habitat. *Id.* (emphasis added). The final biological opinion has two tables containing the species and critical habitats with jeopardy determinations in the 2021 draft, with a column explaining whether "changes in draft jeopardy determinations were primarily based on 1) revisions to data assumptions and analyses, 2) adoption of general conservation measures […], or 3) addition of species-specific measures to reduce the likelihood of malathion exposure and effects[.]" AR-12266, 12272.

THE FINAL BIOLOGICAL OPINION

A. The Opinion's Organization

The final biological opinion is nearly 20,000 pages, including appendices. AR-12259-32249. It begins with a 14-page executive summary, which explains the opinion's key findings, analysis, and methods. AR-12259-73. The next ~350 pages are the body of the opinion, which explains the interagency consultation history, the proposed action and action area, the statistical methodologies and qualitative analysis performed to evaluate the effects of the action, the expected levels of incidental take, and recommended reasonable and prudent measures and terms

and conditions. AR-12274-12612. The remaining ~19,000 pages are appendices. AR-12613-32247. There are 13 appendices. AR-12613-14. Each appendix has a separate cover page providing background. *See, e.g.*, AR-12692-93 (Appendix C cover page), AR-26819-20 (Appendix K cover page).

Nearly half of the opinion's body is a section titled "Effects of the Action," where the opinion explains the relevant scientific literature and technical work performed. The EPA's Biological Evaluation applied most of this information. This section begins with a discussion of the action's "general effects" on species, including the literature on "toxicological effects" of pesticides. AR-12296-97. The discussion of toxicological effects analyzed EPA-generated "estimated environmental concentrations" of malathion ("EECs") "referring to the levels of malathion anticipated in the environment following applications," with "current pesticide product label information that specifies where malathion can be used and on what resources (e.g., crops or non-agricultural uses)." AR-12261. Plaintiffs do not challenge information about toxicological effects. The opinion then explains how malathion's general effects play out by taxonomic group; separately discusses the general effects on terrestrial species, aquatic species, and plants; and describes how 900 individual plant species are divided into 11 "assessment groups" based on the plants' "taxonomy and reproductive strategy." AR-12347-88. Next, the opinion reviews literature on how various types of species are exposed to pesticides and ways of measuring exposure, explains the sources of data used to measure pesticide usage across the country and the limitations of that data, how conservation measures can limit exposure and effects, and the assumptions and uncertainties made during the consultation. *See, e.g.*, AR-12345, 12395-12475. As also discussed later, Plaintiffs challenge the opinion's reliance on pesticide usage data and the opinion's assumptions made regarding that data.

In the next section of the opinion, titled "Integration and Synthesis," the Service ultimately synthesizes the foregoing information and states its determinations with respect to jeopardy of species and adverse modification/destruction of critical habitats. AR-12505-12585. Like the preceding sections, the "Integration and Synthesis" section does not proceed by examining one species at a time. Rather, the section states conclusions with respect to large groupings (e.g.,

animals vs. plants), forms sub-groups from those large groups based on "broad taxa groupings" (e.g., animal species had sub-groups of amphibians, arachnids, mammals, and more); and occasionally sub-groups its analysis yet again from there (e.g., the amphibian sub-group had separate paragraphs for frogs and salamanders). *See* AR-12510, 12518-19; *see also* AR-26819 (Appendix K cover page breaking down groups of animals and plants).

Despite grouping species together, the "Integration and Synthesis" section nonetheless states the agency performed a species-by-species analysis, but the species-specific analysis is in the appendices. While coming to taxonomic-group-wide rationales and conclusions, the biological opinion states it "capture[d] important species-specific considerations" and "refer[red] to background information in … the most recent listing documents, recovery plans, and 5-year status reviews for the species." AR-12516. Take, for example, the sub-section for "Amphibians," a sub-group of animal species. AR-12518-21. The first paragraph of this sub-section describes amphibians: "[t]his taxa group includes … frogs, salamanders and toads. All amphibians are ectothermic and have skin that is permeable to air and water." AR-12518. Then, in the subsequent paragraphs, the opinion explains characteristics of frogs and toads, characteristics of salamanders, how the opinion used two different statistical tools (described below) to evaluate the magnitude of the effects given amphibians live on both ground and water, the routes of pesticide exposure for amphibians, and why the agency "do[es] not anticipate the Action would appreciably reduce the likelihood of both the survival and recovery of these species in the wild[.]" AR-12518-21. Finally, the "Amphibians" sub-section concludes by pointing the reader to Appendix K, which contains "Integration and Synthesis summaries" for every listed species, then refers to an Excel spreadsheet containing qualitative descriptions of every amphibian species. AR-12520-21; *see generally* AR-26819-20 (cover page explaining Appendix K); AR-27345-28567 (Appendix K-A1, which contains summaries for amphibians). The Court summarizes the key appendices below. Earlier in the opinion, the Service made clear "[w]here rationales for conclusions could be written broadly enough to apply to multiple species within a taxa or geographic group (e.g., sea turtles, mussels), we streamlined reporting within the table or narrative for clarity and to avoid redundancy." AR-12518.

B. "No Jeopardy" Determinations

a. Jeopardy Methodology: Vulnerability, Risk, and Usage

At a high level, the biological opinion's universal "no jeopardy" findings result from a mix of qualitative and quantitative analysis. The opinion's "jeopardy analysis first considers the following three factors:" (1) "vulnerability" (of the species' population to pesticides), (2) "risk" (of pesticides' toxicological effects, including direct effects to the species and indirect effects to the species' food); and (3) "usage" (anticipated overlap between the species' range and the areas where malathion is registered for use and will actually be applied). AR-12511-15. For each species, the opinion assigned a ranking of "low," "medium," or "high" under each factor. *Id.* For example, a species might have "high" vulnerability, "medium" risk, and "low" usage. Appendix J is a template worksheet as to how rankings should be assigned under each factor, and the appendix has separate templates for animal species, island animals, plants, and island plants. AR-26807-26818. These rankings were "a starting point for determining the consequences of the Action to [each] species." AR-12511-15.

i. Vulnerability

First, the "vulnerability" factor weighed several considerations, including:

> (1) the species listing status and recent 5-year status review recommendation (if available), (2) distribution, (3) number of populations, (4) species population trends, (5) if pesticides have been noted as a threat, and (6) impacts from activities associated with environmental baseline and cumulative effects. Sources for this information were listing rules, recovery plans, 5-year status reviews and Species Status Assessments.

AR-12511. With regards to "distribution," "number of populations," and "population trends," the biological opinion explains:

> We considered the distribution of a species as a vulnerability factor with the general view that the smaller or more confined the range, the more susceptible the species may be to a disturbance or stochastic event. If a species was a narrow endemic, or otherwise limited to small, isolated, or fragmented habitats or habitat patches, we assigned a "high vulnerability" ranking to this factor. Where species were wide-ranging and/or able to easily recolonize new or existing habitats, we assigned a low vulnerability ranking to this factor. A "medium vulnerability" ranking was assigned to species that did not clearly fall into either the constrained or widespread categories. […]

> Species that migrate can be considered to be inherently wide-ranging based on the extent of their ranges, especially for those that are long-distance migrants. However, parts of a species range that the species relies on seasonally, such as for breeding or overwintering, may be fragmented and constrained. The assignment of vulnerability rankings takes into consideration how vulnerable the species may be across its range as well as in seasonally used portions of its range within the U.S. In some cases, even though a "low vulnerability" ranking generally applies to wide-ranging species, a "high vulnerability" or "medium vulnerability" ranking for this factor may be assigned to migratory species to more accurately reflect how vulnerable the species may be in light of seasonal habitat requirements.
>
> For numbers of populations, we considered whether a species was limited to a single population, few populations, or many populations. […] We assigned vulnerability ranking factors of: "high vulnerability" to species with a single population (or in some cases a single, small metapopulation, as appropriate); "medium vulnerability" to species with "few" populations, which allow for at least a limited level of redundancy to protect against stochastic events or localized extirpations; and "low vulnerability" to species with numerous populations, which may provide a greater level of redundancy. […]
>
> For species population trends, we considered whether populations are declining, stable or increasing, based on the most recent information from listing rules, recovery plans, 5-year status reviews and other Service sources for the species (e.g., Service species experts).

AR-12511-13.

ii. Risk

Second, the "risk" factor "is based on (1) direct effects, which include mortality and sublethal effects (e.g., effects associated with growth, reproduction, behavior, sensory, and enzyme) and (2) indirect effects (e.g., effects to prey or other forage items or host species)." AR-12513. In other words, the biological opinion's "risk" analysis mirrors that of the EPA's Biological Evaluation. *Compare id.*, *with* AR-42671-77 (assessing multiple "lines of evidence," namely the "direct effects" on species' "mortality," "growth," "reproduction," "behavior," and "sensory function;" as well as malathion's "indirect effects" on species' prey base, habitat, pollinators, etc. at expected concentrations" of pesticides). To assess "risk," the biological opinion used two statistical tools: the Magnitude of Effect Tool and R-Plots.

The Magnitude of Effect Tool ("MagTool"), created by the EPA, measures "the magnitude of the effect of potential pesticide use to a listed species on a population scale." AR-26708. The

executive summary describes the MagTool as "an integrated spreadsheet calculator that combines exposure and magnitude of effects to certain species based on the residue of malathion on the dietary item a species will consume." AR-12263. A more detailed explanation of the MagTool is in the opinion's body, AR-12431-61, and Appendix D. AR-26707-19. Although the MagTool's manual states it is capable of analyzing effects on many types of species (*e.g.*, terrestrial vs. aquatic), *see id.*, the Service used the MagTool only for terrestrial vertebrates and amphibians. AR-12263.

To analyze the effects of pesticides on all other species, (that is, "invertebrates, aquatic vertebrate species and plants"), the Service used the "the software program R." AR-12263. The software program R allows users to make an "R-Plot," which is "a graph" visualizing data. *See* AR-12345. The biological opinion refers to the process of generating a graph as the "R-Plot Tool" and explains "[t]he R-Plot Tool was developed by NMFS for use by the Service in the national pesticide consultations and used to help characterize risk for listed terrestrial invertebrate species. R-Plots overlay toxicity data (*i.e.*, values [of pesticides] at which adverse effects [on species] are detected) with exposure information (*i.e.*, [estimated environmental concentrations of pesticides] for differing types of dietary items)." AR-12440.

iii. Usage

The third factor, and the only factor Plaintiffs challenge here, is usage, *i.e.*, "the total estimated percentage of the species range where [malathion] usage that will have effects to the species is anticipated to occur." AR-12514. In other words, if expressed as a division formula, the anticipated pesticide usage is the numerator and the species' range is the denominator: $Usage = \frac{Anticipated\ pesticide\ usage}{Species\ range}$. Per the template worksheet in Appendix J for animal species (pasted below), if malathion is anticipated to be used in at least 10% of the species' range, then the species has a "high" usage ranking, whereas "medium" means 5-10% of the species' range, and "low" means less than 5%:

Factors	Indicator	Selection
USAGE		
Total percent of the species range with anticipated usage for uses that may have effects to the species[1]	High = >10%; Medium = 5-10%; Low = <5%	Choose an item.
Confidence level: Modifier for consideration of this factor	CalPUR data = 75-100%; Standard data = <75% CalPUR data (based on % of range in CA)	Choose an item.
Overall Rank: USAGE	Based on H, M or L in total percent above.	Choose an item.

[1] Totals are not reduced for potential overlap between mosquito control and other uses, as the extent to which these uses may occur on the same sites is unknown.

AR-26809.

The Service distinguishes between "use" and "usage." "Use" refers to a registered, labeled use of malathion, *e.g.*, applying malathion on corn crops vs. using malathion as mosquito control. *See* AR-12389 ("malathion use sites were binned (i.e., categorized) by the general land cover class that represents the use pattern (e.g., grapes are categorized with orchards and vineyards …)"); AR-12408. For example, data showing counties where corn is grown would be considered "use" data. "Usage," on the other hand, refers to estimates of how malathion is "actually applied on the landscape." AR-12408. So, data on the percentage of corn crops treated by malathion would be considered "usage" data. For each species, the Service estimated the degree to which a species' range overlaps with *both* use *and* usage. For example, a species' range might overlap with 50% of sites where corn is grown (50% use), but only 2% of corn crops to which malathion is actually applied (2% usage). Whether the Service characterized a species' usage factor as "high," "medium," or "low" hinges on only the usage percentage.

To calculate the usage factor's numerator (anticipated pesticide usage), the biological opinion predicted the "areas and land use types where we expect malathion to be used, over the 15-year duration of the Action," based on "the labels as currently written" and "the available usage

data." AR-12515. Generally speaking, the opinion's calculation used the same GIS mapping methods as the EPA's biological evaluation, but with certain "refinements and deviations." *See* AR-12389-91. For example, the Service began by mapping data from the same source the EPA used, the National Agricultural Statistics Service, "to confirm the presence of absence of individual use sites [of malathion] or crops within a county." *See* AR-12389, 12391; 42664. One refinement was to use more recent data from this source. *See id.* Another refinement was to remove federal lands from the areas malathion is expect to be applied "due to the limited amount of anticipated [malathion] usage in these areas[.]" AR-12391. Additionally, if malathion is registered for use on a crop, but that crop is not grown in a given county, the biological opinion's analysis "removed" that "portion[] of overlap" from its map of expected malathion usage. *Id.* The biological opinion details other refinements. *See* AR-12389-91.

In an attempt to counteract the uncertainties in usage data discussed above, the Service "employed the following assumptions to estimate the number of acres treated" by malathion for states outside of California, to estimate the Percent of Crops Treated ("PCT") by malathion. AR-12416. If a state had available data, "we took the average of the maximum values for surveyed crops." *Id.* If a state had "no surveyed crops," "we applied the highest average calculated from surveyed states." *Id.* And the Service "assumed" 2.5% of crops were treated by malathion "[f]or states with crops that were surveyed and reported" either no usage or less than 2.5% of crops treated. *Id.* In other words, through these assumptions, the Service ostensibly *overestimated* the application of malathion and, by extension, malathion's effects on listed species. And despite the "particularly high uncertainty" and limitations in the new data sources, the Service "anticipate[d] these assumptions reasonably estimate how many acres are likely to be treated with malathion in a single year, understanding that this usage may not be consistent from year to year, as malathion may be used rotationally or sporadically in certain crops." *Id.*

The purpose of the Service's refinements and assumptions is to narrow the "effects of the Action" to those which are "reasonably certain to occur," in accordance with federal regulations. *See* 12297-98, 12506; *see also* AR-356-57 (quoting "50 C.F.R. 402.02"). The biological opinion acknowledges there are "limitations associated with usage data," namely the Service could not

determine whether the data was "robust[] at the state level or any geographic specificity at the sub-state label," what an 'adequate sample size" would be, "how many applicators responded to the survey[s], [or] how many acres are represented by the survey[s.]" AR-12297, AR-12409. Yet despite these limitations, the opinion states it was nonetheless "appropriate[]" to consider the usage data:

> Mindful of the limitations associated with usage data, we utilize usage data to inform our analysis, but it is not dispositive in determining "effects of the Action." ***Because usage data represents historical patterns of how and where malathion is applied on the landscape, it is appropriately considered in determining "effects of the Action,"*** which, under ESA section 7 regulations and Administrative Procedure Act standards, respectively, must be "reasonably certain to occur" and rationally based. At the same time, particularly where there are informational gaps, we apply usage data in this Opinion using our best professional judgment to make assumptions that are not only reasonable but are appropriately conservative for the species and critical habitat to determine whether EPA's Action ensures against the likelihood of jeopardy or destruction and adverse modification. Although usage data is a portion of the best scientific and commercial data available, it is only one of many factors and points of data we consider in determining "effects of the Action."

AR-12297-98 (emphasis added); *see also* AR-12506 ("[W]e do not anticipate that malathion will be used in all the areas it is authorized to be applied under the label over the duration of the Action. As we must also consider what effects are reasonably certain to occur, we considered the best available scientific and commercial data available [sic] for usage data to better predict the consequences from the Action.")

To calculate the usage factor's denominator (species range), the Service alludes to a process of "collection of current range maps[.]" AR-12473. The opinion explains:

> One of the main uncertainties within the analysis for this consultation is the reliance on current ranges for each species that may not accurately reflect the species' actual distribution within those mapped ranges. Often these ranges are defined as entire counties or smaller subunits (e.g., quads, HUCs) within which the species is known to occur but do not identify actual areas of suitable habitat where the species is likely to be found. During the collection of current range maps for these consultations, we requested that Service Field Offices provide refined current range maps if available. Additionally, through internal Service efforts to refine species ranges, and in some cases with the assistance of FIFRA Endangered Species Task Force biologists, we were able to refine and improve many of the existing current range maps, either by reducing the number of overall counties or by mapping at a sub-county level (e.g., by habitat associations for

> Hawaii plants), based on the best scientific and commercial data available at the time.
>
> Without detailed information on where a species can be found, our assumption for this assessment is that each species analyzed is uniformly distributed within its range. This may overestimate or underestimate our understanding of where a species is found. Exceptions to this assumption were for species where information is known based on specific data from Service Recovery Plans or 5-Year Reviews (e.g., Moapa Dace). Some species will have information where specific segments of the range have been identified for recovery, for critical habitat, or for other specified uses, and the locations of populations of the species are known within these areas.

AR-12473. Beyond these two paragraphs, there is no explanation of the process by which the Service "collect[ed] … current range maps," and the opinion does not have an example of a species range map the Service converted into an estimate, in acres. *See generally* AR-12559-12612; AR-12692-26706 (Appendix C); AR-26819-30762 (Appendix K).

Ultimately, for each species, the biological opinion's "usage" analysis consists of a table with pesticide usage data, followed by three lines about the species' range. Consider, for instance, the entire "usage" analysis for the valley elderberry longhorn beetle, which the parties' briefing discusses:

USAGE
(Anticipated usage within the range based on past usage data)

Agricultural usage based on CalPUR data

Use type	Risk to species[1]	Use overlap with range		Estimated usage in range[2]	
		Acres	%	Acres	%
Mosquito Control	D	8,991,423	95.1	231,882	2.58
Orchards and Vineyards	D,I	1,266,290	13.4	13,182	0.139
Other Crops	D,I	638,104	6.75	41	<0.001
Developed	D,I	578,071	6.12	28,904	0.31
Rice	D,I	502,813	5.32	747	0.008
Open Space Developed	D,I	414,644	4.39	20,732	0.22
Pasture	D,I	396,925	4.2	33,157	0.351
Wheat	D,I	224,110	2.37	1,620	0.017
Vegetables and Ground Fruit	D,I	213,922	2.26	4,513	0.048
Other Grains	D,I	191,366	2.02	519	0.006
Corn	D,I	147,521	1.56	138	0.001
Cotton	D,I	613,469	0.65	667	0.007
Other Row Crops	D,I	56,744	0.6	0	0
Nurseries	D,I	5,828	0.06	615	0.007
Christmas Trees	D,I	1	<0.01	0	
Sub-TOTAL (D): *Other uses with direct effects only*[3]		5,249,809	49.71	104,835	1.18
Sub- TOTAL (I): *Other uses with indirect effects only*[3]		5,249,809	49.71	104,835	1.18
TOTAL[4]:		14,241,232	100#	336,717	3.76

#Use overlaps with range are additive and cannot be greater than 100%.
**Overlap acreage greater than acres in species range.

 # acres in species range: 9,450,948 acres
% of range in California (i.e., where CalPUR data is available): 100%
Range overlap with Federal lands: 197,986 acres, 2.09%

[1] Direct effects (D), Indirect effects (I), No effects expected (N), Use site not utilized by the species (*)
[2] Estimated usage in the range is based on information about annual past usage.
[3] Mosquito control has the potential to overlap with other uses. It is not included in the Sub-TOTALs.
[4] TOTAL includes usage on all use sites with effects, including mosquito control.

AR-29114. The lines below the table indicate the beetle's range is 9,450,948 acres; the entire range is in California, and roughly 2% overlaps with Federal lands. *Id.* The table illustrates 15 registered uses of malathion, including corn, cotton, and mosquito control. *Id.* One column identifies the "risk to species" for each use: 14 uses have both "direct effects" and "indirect effects" to the beetle, while one use has direct effects, but not indirect effects. *Id.* Although roughly 100% of the species' range overlaps with at least one use site category of malathion (*e.g.*, orchards and vineyards), the estimated usage of malathion (*i.e.*, how malathion is "actually applied

on the landscape") overlaps with just 3.76% of the beetle's range. *Id.*; *see* AR-12408. Most of the usage overlap is for mosquito control (2.58%), followed by usage for pasture (0.351%) and orchards and vineyards (0.139%). AR-29114. And the usage overlap calculations are "based on past usage data" from CalPUR, *id.*, the only usage dataset which the Service considered "robust." *See* AR-12417.

b. Appendix C: Species' Profiles

Defendants' jeopardy determinations relied on Appendix C, titled "Status of the Species and Habitats," which contains qualitative profiles of every species covered by the opinion. AR-12692. The profiles are based on "information … collected by consultants and U.S. Fish and Wildlife Service staff between 2014 and 2017 and updated in 2019, for use in the national pesticide consultations[.]" AR-2148; AR-12692. The information comes "predominantly from publicly available data, and typically from U.S. Fish and Wildlife Service listing decisions, recovery plans, 5-year reviews, species status reviews, assessments, etc." *Id.*

Inexplicably, every page of Appendix C says "DRAFT – For Review" at the top. AR-12694-19228. The cover page for Appendix C is identical to its cover page in the draft biological opinion, except the final version's cover page explains some species profiles for proposed listed species are "not yet completed." *Compare* AR-12692-93, *with* AR-2148. Both cover pages note the profiles "are in draft form," "have yet to be reviewed and finalized by U.S. Fish and Wildlife Service species experts," and therefore "may not necessarily encompass all the information that is available or known by species leads or the most recent knowledge regarding the species." AR-12692.

To illustrate what a species profile says, and by extension what the Service relied on, consider the profile for the valley elderberry longhorn beetle. AR-16860-75. The critical habitat for the species is two circumscribed zones in Sacramento County, California. AR-16861. The species' range is much larger: two paragraphs delineate the beetles' "historical range" and the "current range":

Historical Range

Although the entire historical distribution of the valley elderberry

> longhorn beetle is unknown, extensive destruction of riparian forests of the Central Valley during the past 150 years strongly suggests that the beetle's range has decreased and become greatly fragmented. Museum records indicate that the beetle has been collected in four central California counties: Merced, Sacramento, Solano, and Yolo (USFWS 1984).
>
> **Current Range**
>
> When the valley elderberry longhorn beetle was listed in 1980, it was known from 10 occurrence records at three locations: the Merced River (Merced County), the American River (Sacramento County), and Putah Creek (Yolo County) of the Central Valley of California. There are approximately 190 records of the animal (largely based on exit holes) in the Central Valley. Although records exist for Kern County, no specimens or observations of living beetles exist the [sic] support the assertion that the species is found there (USFWS 2006).

Id. The next section describes the species' "life history," including how the species "feeds almost exclusively" on elderberry plants, "requires the riparian moist woodlands in which the plant grows," and "usually stays on or near [one] host plant for the duration of its life." AR-16861-65 (cleaned up). A paragraph titled "population narrative" explains:

> Occupancy of the valley elderberry longhorn beetle within the presumed historical range over the past 16 years has occurred in approximately 18 hydrologic units and 36 geographical locations in the Central Valley. […] With regard to population size, no true estimates have been made due to the cryptic nature of the species. Based on a spatial analysis of valley elderberry longhorn beetle populations in the Central Valley, Talley concluded that the several-hundred-meter distances observed between local aggregations of the species supports a limited migration distance for this species. An integrative approach to all three spatial frameworks (patch, gradient, and hierarchical) best defined a population structure for the valley elderberry longhorn beetle. […]

AR-16865.

Another section describes "threats and stressors" to the species, such as "loss of habitat" due to the conversion of riparian forests to agriculture and urban development, "climate change," and "pesticides." AR-16865-67 (cleaned up). As relevant here, the "climate change" and "pesticides" portions explain, respectively:

> Average temperatures have been rising in the Central Valley of California, and this trend will likely continue because of climate change. […] However, there is a great deal of uncertainty as to the rate at which the average temperature may increase, and the effect of climate change on both precipitation and drought. [… T]he impact of

> climate change on the valley elderberry longhorn beetle will depend on a complex array of other factors, including how the subspecies and its habitat respond to climate change. One of the elderberry species on which the beetle depends is well adapted to warm temperatures, and extends its range into southern California and northern Mexico. Information is unavailable that would allow for a meaningful prediction of whether potential changes in temperature and precipitation patterns would significantly affect elderberry growth[. …] (79 FR 55874).
>
> […]
>
> Many pesticides are commonly used in the valley elderberry longhorn beetle's range. These pesticides include insecticides (most of which are broad-spectrum and likely toxic to the beetle) and herbicides (which may harm or kill its elderberry host plants). In 1997, the California Department of Pesticide Regulation listed 239 pesticide active ingredients applied in proximity to locations of the beetle. Four of the five counties (Fresno, Kern, Tulare, and Madera) that have the greatest pesticide use in California are in the San Joaquin Valley, where approximately 33 percent of beetle occurrences are documented. Many pesticide applications likely coincide with the period when adult beetles are active, and when the beetle eggs and early larval stages occur. These are considered the life stages at which the beetle is most vulnerable to pesticide effects, because they occur on the outside of elderberry stems. The pesticides, although not applied directly to beetle habitat, may indirectly affect the beetle or its habitat if pesticides drift from nearby locations (79 FR 55874).

AR-16866-67. Next, the profile's "Recovery" section identifies factors that affect the ability of the species to recover and consequently be removed from the list of endangered species. AR-16867-68.

Finally, a "Conservation Measures and Best Management Practices" section outlines "conservation guidelines for federal and nonfederal project applicants needing incidental take authorization" under Section 7 of the Endangered Species Act. *See* AR-16869-70. The Service created these guidelines for "project applicants … to avoid and minimize adverse effects on the valley elderberry longhorn beetle." *Id.* The guidelines include "avoidance" of construction activities within a "100-ft. … buffer"; "protective measures" like fencing and flagging around construction areas; and "restoration" of damage done to areas near elderberry plants. *Id.* The guidelines also instruct "[n]o insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas" and requires "[e]lderberry plants must be transplanted [to a conservation area] if they cannot be avoided by the proposed project. AR-16870. The guidelines also outline specific requirements for transplanting elderberry

plants, including:

> A qualified biologist (monitor) must be on site for the duration of the transplanting of the elderberry plants to ensure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to [the Service] and to the California Department of Fish and Wildlife (CDFW).

AR-16870-71. The list of guidelines continues for three more pages and cites information in Service-created documents, such as recovery plans. AR-16871-74.

Broadly speaking, the other species profiles in Appendix C proceed in a similar fashion. The profiles describe the species and its designated critical habitats; delineate "historical range" and "current range"; describe the species' "life history" with narratives about feeding and reproduction; identify the population size, trends, and distribution; explain the species' threats and stressors, which occasionally includes pesticides; and has sections for "recovery" and "conservation measures and best practices." *See generally, e.g.*, AR-13768-88 (Yellow-Billed Cuckoo profile); AR-13901-15 (Whooping Crane profile).

C. Critical Habitat Determinations

The Service determined malathion is not likely to adversely modify or destroy any species' critical habitat. AR-12260. "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species." AR-30765 (quoting 50 C.F.R. § 402.02).

Critical habitat designations, published in the Federal Register ("critical habitat rules"), are the heart of the Service's determinations. As noted above, a habitat is considered "critical" if it has physical or biological features "essential" for the species, known as PBFs.[3] And when designating a species' critical habitat, the Service "shall" list known PBFs in the species' critical

[3] Over time, federal regulations have used several phrases to describe these features, such as "primary constituent elements" or "essential features." *See* AR-12490. The Court uses "physical and biological features" because when the biological opinion was published, the regulations in effect used that phrase. *See* 50 C.F.R. § 424.12(b)(5). As the biological opinion explains, "we broadly use the term PBFs when referring to the key components of critical habitats that are described as essential for the conservation of the listed species … as a standard way to cover all features described by these terms." AR-12490.

habitat description. *See Alaska Oil*, 815 F.3d at 555 (quoting 50 C.F.R. § 424.12(b)(5)). Some generalized examples of PBFs include food, water, shelter, and breeding sites; these are "essential" for species. *Id.*; AR-12490. Naturally, species' critical habitat designations can vary widely; not only do species' have varying needs, but designations have been published over several decades, including times when ESA regulations did not require the Service to list specific PBFs. *See* AR-12490, 30765, 31179.

For its biological opinion, the Service "reviewed all of the currently proposed and designated critical habitats." AR-12492. These designations identify PBFs, but "[n]ot all PBFs are susceptible to pesticides, and some PBFs may be susceptible to some types of pesticides, such as herbicides, but not others." AR-12494. So, to "facilitate [] analysis of the large number of critical habitat proposals and designations," the Service identified four types of PBFs that "may be negatively affected by" malathion. AR-12491. Those four PBF categories are:

> (1) water quality for aquatic or water-dependent species, or conditions related to pollution-levels for terrestrial habitats to function for the species (i.e., habitat function);
>
> (2) arthropods as prey (e.g., for insectivorous species);
>
> (3) non-arthropods, including as prey for omnivorous or carnivorous animal species, as pollinators/seed dispersers for plants, and as host fish for mussels; and
>
> (4) insect pollinators/seed dispersers for plants.
>
> For example, a common PBF for many listed species' critical habitat designations is a sufficient prey base to provide for population viability or growth of the listed species. Where the prey base primarily consists of insects and other arthropods, the use of insecticides may negatively affect the availability of food for those insectivorous listed species. A substantial decrease in food availability would affect the listed species' ability to grow, reproduce, or survive, and thus, the loss of an important prey base could adversely affect the conservation value of the critical habitat for the species.

Id. (line spacing added). Then, the Service "reviewed each critical habitat rule to determine if" any of these four types of PBFs "are explicitly identified or could be clearly and simply linked to proposed and designated critical habitat PBFs." AR-12498.

During its review of critical habitat designations, the Service placed each critical habitat

into one of three categories. AR-12499; 30765, 31179. "Category 1" is for habitat designations with "generalized, non-specific PBFs," AR-12499, or "no specific PBFs listed in the rules." AR-30765; 31179. "Category 2" represents habitats "with specific PBFs, but none that would be affected by malathion" because the PBFs do not fall in one of the four PBFs the Service pre-identified as "relevant." *See* AR-12499; 30765; 31179. "Category 3" habitats have "PBFs that would be affected by malathion" because the habitat rule lists "one or more of the four relevant types of PBFs." *See id.* Appendix L, which contains every critical habitat determination and rationale, has tables showing the categories in which each critical habitat was placed. AR-30768-75 (critical habitats for animal species), AR-31183-31220 (critical habitats for plant species).

Once each habitat was categorized, the Service determined whether malathion was likely to destroy or adversely modify the habitat. For every habitat, the answer was "no." But the agency's rationale depended on the category in which the habitat fell.

If a critical habitat was placed in Category 2 (meaning the critical habitat rule has PBFs, but none are "relevant"), the Service "did not undertake any further analysis … as none of the PBFs would be affected by malathion." AR-12499. For every Category 2 habitat, the only information Appendix L provides is the species' name, the fact it is a Category 2 species, and a "rationale" saying "no relevant PBFs." *See generally* AR-30768-75 (animal species' habitats), AR-31183-31220 (plant species' habitats). Again, the biological opinion's only explanation as to how a critical habitat fell into Category 2 is the Service "reviewed each critical habitat rule to determine if" a relevant PBF was "explicitly identified or could be clearly and simply linked." AR-12498. The biological opinion does not explain what it means to "explicitly identif[y]" or "clearly and simply link[]" a PBF from a critical habitat rule. *See generally* AR-12274-12612. Compare this to the jeopardy analysis above, for which the Service describes data sources and provides a template worksheet explaining "usage" calculations. Instead, every Category 2 critical habitat determination rests on just three words: "no relevant PBFs."

By contrast, the analysis for a Category 1 habitat depended on whether its designation had generalized PBFs or no PBFs at all. If a critical habitat was placed in Category 1, the Service "reviewed information … in the critical habitat rule to determine if any of the types of PBFs

shown above would likely pertain to the critical habitat." AR-30765. "In cases where no relevant PBFs were identified, the critical habitat was treated the same as those in Category 2," *id.*, and accordingly the Service determined malathion would not adversely modify or destroy those habitats with just a three-word rationale: "no relevant PBFs." *See* AR-30768-75; AR-31183-31220. For example, the Gypsum wild-buckwheat plant species is listed as a Category 1 species in a table in Appendix L, AR-31197, and Appendix L has no reference whatsoever of its critical habitat rule except for the words "no relevant PBFs." *See generally* AR-31178-31308. The same is true of every Category 2 habitat. *See generally* AR-30768-75; AR-31183-31220.

Every remaining critical habitat belongs to "Category 3, as well as a subset of those in Category 1 for which [the Service was] able to identify habitat elements constituting PBFs that could be affected by malathion." AR-12499. To determine malathion's effects on Category 3 and some Category 1 habitats, the Service identified a "preliminary concern level" then "further assessed" the critical habitats, as explained below. AR-12501.

a. Preliminary Concern Level: The Dichotomous Key

The Service used a "dichotomous key" to identify a preliminary concern level for each critical habitat. AR-12499; *see* AR-31309-11 (Appendix L-A instructing biologists how to use the key). The key is "dichotomous" because it has only two concern levels: "high" or "low." *Id.* The dichotomous key analyzes factors in a sequence: if a species is not assigned a "low" ranking under one factor, then the Service proceeds to the next factor. *See* AR-31309-11 (instructing, under factor 1, to determine "low concern," otherwise "go to 2").

Under the first factor, "Overlap," the Service considered whether the critical habitat spatially overlaps with malathion's use sites. AR-31310. This factor mirrors the species jeopardy analysis above; if the "[c]ritical habitat does not overlap with use sites," the habitat was assigned "low concern," otherwise the habitat analysis proceeded to the second factor. *Id.* For this step, the Service used the EPA's Biological Evaluation "as available." *Id.* "For those critical habitats that were not included in the [Biological Evaluation], an overlap analysis was not available, and species range use overlap was used as an approximation[.]" AR-12500.

Under the second factor, "Federal Lands," "for critical habitats that overlap with malathion

use sites, [the Service] determined which critical habitats primarily occur on Federal lands[.]" *Id.* If at least "95% of the critical habitat is on Federal lands," then the habitat was ranked "low concern."[4] AR-31310. Otherwise, the habitat analysis proceeded to the next factor. *Id.*

Under the next three factors, the Service's dichotomous key uniformly assigns "low concern" to entire groupings of species based on how malathion affects the relevant PBFs on which those groupings rely. If the habitat's relevant PBF is "non-arthopods" (invertebrates) or "water quality," then entire groupings of species (e.g., birds, reptiles, mammals, lichen plants) were automatically ranked "low concern." *See* AR-31310-11. The biological opinion explains why some groups, but not others, have "low concern." In simple terms, the Service acknowledges malathion can negatively affect relevant features which make habitats "critical" for a species; for example, malathion kills invertebrate prey and "is expected to cause temporary negative effects to water quality." *See* AR-12494-96. But toxicology literature and data show some taxonomic groups are more "sensitive to malathion" than others. *Id.*; *see, e.g.*, AR-12347-88 (describing the separate lines of evidence regarding malathion exposure to groupings of animals and plants). Additionally, malathion's registration comes with conservation measures, such as labeling changes and timing restrictions, which the Service believes will reduce malathion's effects on these essential habitat features. *See* AR-12494-99.

When a relevant PBF is at a "high risk" for a certain taxonomic group, however, the biological opinion appears to contradict itself as to how the Service proceeded with its analysis. The contradictions are twofold. First, Appendix L's instructions do not contain the same four relevant PBFs as the biological opinion's body, quoted above. *Compare* AR-12491 (describing

[4] Plaintiffs do not challenge the 95% threshold and the biological opinion does not explain why it chose that threshold. *See* AR-31310. But elsewhere, the opinion explains why it assumes "malathion usage is likely to occur on Federal lands … only in very localized areas and on a limited basis." AR-12428. The opinion notes the agencies that manage federal lands "each employ designated pesticide coordinators, provide policy and direction on pesticide use, have a process in place to review and approve pesticide use proposals[,] and maintain reports on usage." AR-12427. Additionally, usage data from those agencies indicated "malathion was used on [Bureau of Land Management] lands in 7 of the 13 years from 2003-2015" and "the largest total area treated in a given year was … far less than 1% … of public lands BLM manages[.]" AR-12428.

"water quality … (i.e., habitat function)" as the first relevant PBF), *with* AR-31310 (listing "water quality" and "habitat function" as two distinct PBFs that are analyzed differently under the dichotomous key). Second, the biological opinion states "PBFs consisting of at least one vulnerable feature were given a high concern ranking." AR-12501. That is not what Appendix L says. Appendix L does not assign a "high concern" ranking based on the PBF factors; Appendix L explicitly instructs biologists to "go to" the final factor if the taxonomic group has "[h]igh risk to one or more PBF[s.]" AR-31310-11. That sequential instruction ("go to" a later-numbered factor) is what Appendix L says for every factor when a critical habitat is not given a "low concern" level. *See id.* So, Appendix L seems to suggest the only way a critical habitat can receive a "high concern" level is at the final factor, that is, *after* the Service identifies the relevant PBF and taxonomic group.

In any event, for any critical habitat that has not yet been designated "low concern" in this sequence, the Service analyzed the final factor: malathion's usage overlap with critical habitats. If "[a]nnual [malathion] usage across the critical habitat area is >5%," then the critical habitat was considered of "[h]igh concern." AR-31311. Otherwise, if usage had less than 5% overlap, the critical habitat was "[l]ow concern." *Id.* The overlap calculation relies on the same species range estimates and the same data as the "usage" analysis for species jeopardy:

> Anticipated usage overlap for critical habitats was not available due to difficulties with conducting spatial overlap analyses with incompatible shape files for critical habitat. The boundaries of many proposed and designated critical habitats consisted of complex geometries that resulted in erroneous overlap calculations. These errors tended to overinflate the overlap measurements and the calculations were deemed unsuitable for use in our analysis. The removal of Federal lands from critical habitat geospatial data further exacerbated this issue. Thus, **our decision was to use the species range usage information for calculating anticipated usage in the critical habitat analysis.** Uses that did not overlap with critical habitat were not included in the critical habitat analysis, even if there was overlap with those use sites in the species' range. Since usage data occurs at relatively coarse resolutions, with mosquito adulticide usage data given at the county-level and non-mosquito adulticide usage data given at the state level, species range usage would be expected to be similar to critical habitat usage given that we would not expect usage overlap values to change over a broad spatial scale. Since critical habitats are typically proposed or designated within (or outside but near, in some instances) the species' range, we expect that usage information from the species range is generally an appropriate

> approximation for usage information on critical habitat, and for use overlaps for critical habitats where this information was not available in the BE.

AR-12501-02 (emphasis added); *see also* AR-31311 ("Source: Usage data from the species [Integration and Synthesis summaries] for those uses within the critical habitat.") The Service does not explain why it chose a 5% usage overlap threshold. *See* AR-12501-02; AR-31309-11.

b. The Service's Further Assessment and Final Habitat Determinations

After the "initial assessment" above, the Service made final determinations regarding whether malathion was likely to adversely modify or destroy critical habitat. To do so, the Service first confirmed whether the preliminary concern level was appropriate:

> For critical habitats that had overlap with use sites and were not primarily on Federal lands, we considered additional species-specific information, such as prey and habitat preferences, whether the species had obligate or generalist relationships with host fish or pollinators, the timing of important life history events, and other relevant information that might modify the vulnerability of the PBFs or consequences of anticipated effects. We conducted additional review of specific cases where usage data was near the high/low concern cutoff to confirm if concern was appropriately assigned. We changed the concern level to increase or decrease concern as appropriate considering this additional information and review (e.g., increased concern for critical habitats reliant on groundwater features originating from areas outside of critical habitat).

AR-12502. In other words, the Service assigned another "high" or "low" concern ranking based on the same criteria as the initial assessment (use site overlap, Federal lands overlap, the relevant PBFs, and usage overlap), but with "species-specific information" regarding PBFs, as opposed to giving a concern level for entire groupings of species. *Compare id.*, *with* AR-31310-11. Additionally, if the usage calculation was "near" the 5% usage overlap cutoff, the Service "conducted additional review" and "changed the concern level … as appropriate." AR-12502. The Service does not explain what this "additional information and review" entailed; the only example of "additional information and review" is where the Service may have "increased concern for critical habitats reliant on groundwater features originating from areas outside of critical habitat." *Id.* The Service did not review species-specific information or conduct additional review of habitats under the first two factors, *i.e.*, critical habitats that had no use site overlap and were primarily on Federal lands. *See id.* Finally,

> To make the final determinations for critical habitats that overlap with malathion use sites and are not primarily located on Federal lands, we evaluated applicable general conservation measures that have been incorporated into the Action and the degree to which the measures would sufficiently reduce the risk of effects to the PBFs and avoid destruction or adverse modification. In most cases where the concern was low, we expect that the general conservation measures would reduce the environmental concentrations of malathion to a level that would only result in minimal effects to the PBFs, even in cases where there might be especially vital or vulnerable areas of critical habitat that overlap with malathion use sites. In some cases where the concern was high and general conservation measures did not sufficiently reduce the risk of effects to the PBFs, we developed species-specific measures to address the additional need for protection, which were incorporated into the Action.

AR-12501.

Ultimately, the Service determined malathion was not likely to adversely modify or destroy any critical habitat. Under the first factor, the Service determined malathion had no use site overlap with critical habitats of 30 animal species, and therefore the "habitats are not expected by the use of malathion to an appreciable degree," which was "confirmed" by a "qualitative review of these critical habitats." AR-30778. The Service acknowledged malathion "applications could occur near the species' critical habitat" and therefore "reach the critical habitat through runoff or spray drift." *Id.* However, "malathion does not tend to persist in the environment" because of its short half-life and "conservation measures [are] in place to reduce the risk of exposure[.]" *Id.* Under the second factor, the Service determined malathion is unlikely to adversely modify or destroy 17 animal species' and 4 plant species' critical habitat because the habitats had a greater than 95% overlap with Federal lands. AR-30780, 31182.

All remaining critical habitat determinations were ostensibly based on PBFs. For all Category 2 habitats, as well as Category 1 habitats where the Service did not identify a relevant PBF, the Service offered only a three-word rationale of "no relevant PBFs." *See, e.g.*, AR-30768-75; AR-31183-31220. Appendix L does not recite critical habitat rules for Category 2 habitats. Instead, at one point the appendix states "[m]ore details about the critical habitat designations and any associated PBFs are in … Appendix C." AR-30768.

The Service wrote paragraph-form critical habitat determinations for the remaining Category 1 habitats and Category 3 habitats. *Id.* Each determination is roughly 1.5 pages. *See*

generally AR-30764-31177. Each determination describes the species and its critical habitat designation in one paragraph, followed by two tables identifying the relevant PBF and the percentage of the critical habitat's overlap with use sites and malathion usage. *See generally id*; *see, e.g.*, AR-31009 (table for Devils River Minnow species identifying "water quality" as a "Feature of Critical Habitat"), AR-31010 (table for same species identifying 42.96% use overlap and 1.17% usage overlap).

Every paragraph-form determination has a "Rationale" section which seems to follow the same template, and the template appears to be completed with information from the preceding tables. For example, in Appendix L-A, the first two paragraphs in every "Rationale" section say the following (emphasis added to illustrate which information is based on the preceding tables):

> Labeled uses of malathion are expected to affect [relevant PBF(s)], which is a critical habitat PBF essential for the conservation of the species. The results of the dichotomous key indicated is a preliminary [high or low] level of concern for impacts to [relevant PBF(s)]. As discussed below, while we anticipate impacts to the PBFs, we do not anticipate the effects of the Action are likely to appreciably diminish the value of the critical habitat as a whole for the species.
>
> Malathion use sites overlap with [percentage] of the critical habitat, with [percentage] and [percentage] overlapping with mosquito control and non-mosquito control use sites, respectively. Available data indicates that usage will occur on [percentage] of critical habitat annually, with usage on [percentage] of the critical habitat from mosquito control activities and usage on [percentage] of the critical habitat from non-mosquito control activities.

See generally id. (emphasis added). Immediately following those two paragraphs, a "Rationale" section will occasionally state:

> A fairly large portion of the species' critical habitat ([percentage]) is on Federal lands, where malathion usage is expected to be extremely low and carried out with avoidance and minimization measures for listed species and critical habitats (as described in the effects of the Action section of the Opinion). Thus, while usage may occur anywhere within the overlapping use sites, we are primarily concerned about the effects of malathion on the non-Federal portion of the critical habitat, as we anticipate no more than low level effects on the Federal portion. While expected use may be high and usage low outside of the Federal portion of critical habitat, and while this usage may change in amount over time, the large portion of critical habitat contained on Federal lands is likely to remain of consistent quality with no or low impacts from malathion use.

See generally id. (emphasis added). Except for the highlighted portion, that paragraph appears

verbatim roughly 30 times in Appendix L-A, and every time, it is the third paragraph in the "Rationale" section. *See id.* Then, the following paragraph appears roughly 150 times as the second-to-last paragraph:

> General conservation measures that are to be implemented widely, such as aquatic habitat buffers and rain restrictions, will further reduce environmental concentrations of malathion. Buffers, which specify on the label a distance from water bodies where pesticides are not to be applied, are expected to substantially reduce spray drift from entering aquatic habitats. Rain restrictions, where malathion is not to be applied within 24-hours (for residential uses) or 48-hours (for agricultural uses) of a forecasted rain event or when the soil is saturated, are expected to provide time for the pesticide to degrade before runoff events can occur, substantially decreasing environmental concentrations of malathion as well. These conservation measures will further reduce the risk of impacts to ["water quality" and/or "host fish"] PBFs.

See id. (emphasis added). Finally, each determination's "Rationale" section concludes with a citation to the critical habitat rule in the Federal Register, after stating:

> We anticipate that malathion usage on use sites that overlap with the critical habitat will be low, and the required conservation measures are expected to further reduce the likelihood of effects to the PBFs. We do not anticipate that malathion will directly or indirectly alter [relevant PBFs] to an extent that it will appreciably diminish the value of the critical habitat as a whole for the conservation of the species. Therefore, the Action is not likely to result in the destruction or adverse modification of critical habitat for the [species name].

See id. (emphasis added).

On rare occasions, a critical habitat determination's rationale section has more detail. There are 20 instances where the Service identified the species' host fish, and each time the Service stated "we do not expect substantial effects to host fish will occur" due to some combination of the following reasons: the species occupies multiple aquatic habitats, "the low level of expected usage," and "conservation measures." *See, e.g.*, AR-30890-30954. Additionally, the rationale for the Longhorn Fairy Shrimp explained approximately 29% of the species' critical habitat is outside the species' range, but within the range of a related species with similar malathion usage rates, so malathion is unlikely to adversely modify or destroy either shrimp species' critical habitat. AR-30959-60. The Service also describes examples of species-specific measures it developed and incorporated into malathion's labels. *See, e.g.*, AR-30996-97

(describing restrictions on applications made for the Laurel Dace).

DISCUSSION

Plaintiffs bring six claims, all of which contend the final biological opinion violates the Administrative Procedure Act ("APA") and the Endangered Species Act. The APA "authorizes courts to hold unlawful and set aside agency action if it is 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.'" *Ctr. for Biological Diversity v. United States Bureau of Land Mgmt.*, 141 F.4th 976, 993 (9th Cir. 2025) (quoting 5 U.S.C. § 706(2)(A)) (cleaned up).

A biological opinion is a "final agency action" challengeable under the APA. *Bennett v Spear*, 510 U.S. 154, 177–78 (1997). An agency's decision violates the APA if "the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, or offered an explanation for its decision that runs counter to the evidence before the agency or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Motor Vehicle Mfrs. Assn. of United States. v. State Farm Mut. Auto. Co.*, 463 U.S. 29, 43 (1983). "The scope of review under the 'arbitrary and capricious' standard is narrow and a court is not to substitute its judgment for that of the agency. Nevertheless, the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'" *Id.* (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)). "The reviewing court should not attempt itself to make up for such deficiencies; we may not supply a reasoned basis for the agency's action that the agency itself has not given." *Id.*

At the outset, the biological opinion here is atypical, to say the least. The consultation process lasted at least 12 years. AR-12288-91. Unlike most section 7 consultations, the opinion here covers the entire United States and virtually every listed species and critical habitat, as opposed to a discrete location affecting a few species. AR-1522. And unlike, say, a run-of-the-mill construction project in the woods, malathion's effects on each species are less understood because malathion is a chemical that "moves through the environment and interact[s] with other biotic and non-biotic stressors" in a "highly complex manner." AR-12470. So, naturally, "[t]here

are many uncertainties and assumptions that accompany an analysis of this size and scope." *Id.*

Although it is difficult to produce a biological opinion of this size and scope, the opinion must nonetheless comply with the ESA and the APA. The Service must "insure" malathion's registration "is not likely" to jeopardize species or destroy or adversely modify the species' critical habitat. 16 U.S.C. § 1536(a)(2). Both prongs in a biological opinion–species jeopardy and habitat destruction modification–may be set aside under the APA. *Gifford*, 378 F.3d at 1065, 1069, 1077. Under both prongs, the Service's findings cannot "run[] counter to the evidence before the agency" and the findings must have a "reasonably" discernable "path," a "reasoned basis," a "satisfactory explanation" based on the "relevant data," and a "rational connection" to the facts found. *See State Farm*, 463 U.S. at 43 (cleaned up). "At bottom" the biological opinion must "'rationally explain why it did what it did.'" *Bureau of Land Mgmt.*, 141. F.4th at 1014 (quoting *In re Big Thorne Project*, 857 F.3d 968, 976 (9th Cir. 2017)).

In particular, a biological opinion's determination of whether an "effect of the action" is "reasonably certain to occur" may be set aside under the APA. *Ctr. for Biological Diversity v. Haaland*, 87 F.4th 980, 987–90 (9th Cir. 2023). The Ninth Circuit, interpreting ESA regulations, has explained:

> We hold that an effect is reasonably certain to occur if its occurrence is based on "clear and substantial information," 50 C.F.R. § 402.17(b) (2019), not "speculation or conjecture," 84 Fed. Reg. at 44,977. Although the effect need not be "guaranteed to occur," there must be a "degree of certitude" it will happen. 84 Fed. Reg. at 44,977. This is not a particularly stringent standard to meet, but the government must do more than rely on speculation sprinkled with dabs of evidence.

Id. at 989.

Additionally, in reviewing biological opinions under the APA, the Ninth Circuit borrows standards from cases interpreting similar statutes that require environmental assessments. For instance, in *Gifford*, the plaintiffs challenged a biological opinion's methodology for estimating species populations, which was key to the opinion's jeopardy analysis. 378 F.3d at 1066. To evaluate the methodology, the Ninth Circuit directly imported a rule from *Idaho Sporting Cong. Inc. v. Rittenhouse*, 305 F.3d 957, 972–73 (9th Cir. 2002). *See Gifford*, 738 F.3d at 1066 & n.4 (importing "[t]he test for whether the [methodology] is permissible in this case"). And in *Idaho*

Sporting, the court set aside an environmental assessment under the National Forest Management Act because the agency's "own scientists" wrote a report criticizing the agency's methodology for estimating, in acres, certain forest populations. *See* 305 F.3d at 967–70, 71–73 & n.5.

Moreover, the Service "shall use the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2). Generally, "[o]ur deference to agency determinations is at its greatest when that agency is choosing between various scientific models[.]" *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 610 (9th Cir. 2014). "The determination of what constitutes the '*best* scientific data available' belongs to the agency's 'special expertise.... When examining this kind of scientific determination, as opposed to simple findings of fact, a reviewing court must generally be at its most deferential.'" *Id.* at 602 (quoting *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 103 (1983)) (emphasis in *Jewell*). A biological opinion "complies with the best available science standard so long as it does not ignore available studies." *San Luis & Delta-Mendota Water Auth. v. Locke*, 776 F.3d 971, 995 (9th Cir. 2014).

Here, three of Plaintiffs' claims challenge the opinion's jeopardy and critical habitat findings: (1) the "usage" analysis is arbitrary, (2) the assessment of effects to critical habitat is arbitrary, and (3) the opinion fails to consider recovery of critical habitats. Plaintiffs' remaining claims challenge the Incidental Take Statement: (4) the opinion fails to quantify incidental take of species, (5) the opinion's surrogate quantification of take is arbitrary, and (6) the opinion fails to minimize take.

For the reasons set forth below, the Court grants in part and denies in part each motion. The Court enters summary judgment in favor of Plaintiffs with respect to Plaintiffs' first claim: the jeopardy determinations are arbitrary, capricious, and not in accordance with the ESA because the "usage" analysis underlying every determination relies on arbitrary species' range estimates and/or pesticide usage data. With respect to Plaintiffs' second claim, the critical habitat determinations based on "no relevant PBFs" rationales are arbitrary. Accordingly, the Court grants Plaintiffs' motion as to all Category 2 critical habitat determinations and the subset of Category 1 critical habitat determinations that have "no relevant PBFs" rationales. The Court grants summary judgment in favor of Defendants and Intervenor-Defendants as to Plaintiffs' claim the opinion

fails to consider recovery of critical habitats.

The Court does not address the parties' remaining arguments. Because every jeopardy determination is arbitrary because of the arbitrary "usage" analysis, and that analysis likely will be revisited, the Court does not address Plaintiffs' argument the jeopardy determinations fail to address recovery, or that the critical habitat determinations improperly apply pesticide usage data. Additionally, the Court does not address Plaintiffs' claims regarding incidental take because an Incidental Take Statement is required only when an opinion makes a "no jeopardy" or "no adverse modification" finding, 16 U.S.C. § 1536(b)(4), and those findings are arbitrary. As explained below, the Court orders the parties to meet and confer regarding a proper remedy.

I. Plaintiffs Have Article III Standing

Article III standing requires Plaintiffs (1) "ha[ve] suffered an injury in fact that is concrete and particularized, and actual or imminent; (2) the injury is fairly traceable to the challenged conduct; and (3) the injury is likely to be redressed by a favorable court decision." *Salmon Spawning & Recovery Alliance v. Gutierrez*, 545 F.3d 1220, 1226 (9th Cir. 2008) (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560–61 (1992)). For injury in fact, Plaintiffs assert a "procedural injury" because "Plaintiffs have a right to 'procedurally sound consultation'" under the ESA. (Dkt. No. 58 at 18-19) (quoting *Salmon Spawning*, 545 F.3d at 1226).

A. Plaintiffs Have Suffered a Procedural Injury

Under the injury-in-fact requirement, "a plaintiff asserting a procedural injury must show that the procedures in question are designed to protect some threatened concrete interest of his that is the ultimate basis of his standing." *Citizens for Better Forestry v. U.S. Dep't of Agric.*, 341 F.3d 961, 969 (9th Cir. 2003) (cleaned up). Plaintiffs rely on two cases: *Salmon Spawning*, 545 F.3d 1220 and *Center for Biological Diversity v. FWS*, 807 F.3d 1031, 1043-44 (9th Cir. 2015) ("*Biological Diversity*"). Both cases found procedural injuries in suits challenging a biological opinion. Intervenor-Defendant, however, parses these cases to suggest Plaintiffs do not demonstrate an Article III procedural injury because Plaintiffs have not identified a particular consultation procedure the Service did not follow. (Dkt. No. 80 at 7) ("*Salmon Spawning* did not suggest that *any* allegation that the consulting agency had been arbitrary and capricious in

preparing a [Section 7 biological opinion] would constitute a procedural injury.") The Court agrees with Plaintiffs.

In *Salmon Spawning*, conservation-group plaintiffs brought three APA claims based on Section 7 of the ESA. Like Plaintiffs' claims here, the first claim[5] in *Salmon Spawning* challenged a biological opinion which determined the United States' entering a treaty would not jeopardize endangered salmon in the Puget Sound. 545 F.3d at 1225. In this claim, the "alleged legal inadequacy" was the biological opinion was "arbitrary and capricious … and a violation of ESA §§ 7 and 9" because of errors in the opinion's jeopardy analysis:

> the groups claimed that the [biological opinion] improperly compared only the Treaty's effect on harvest rates to harvest rates in the absence of the Treaty, instead of aggregating the effects of take under the Treaty, other harvest impacts, and non-harvest impacts; failed to evaluate the effects of take under the Treaty on the recovery and survival of listed salmon; evaluated only a fraction of the Puget Sound chinook populations; did not develop or apply a biologically based target exploitation rate in its jeopardy evaluation of Upper Willamette chinook; studied harvest impacts on the strongest components of the Lower Columbia chinook population, but not the weaker ones; and failed to analyze or propose reasonable and prudent measures or alternatives that would force the fisheries to target more selectively hatchery-origin salmon. In short, the conservationists challenge the biological foundation for the Treaty.

Id. The court held the plaintiffs had a "concrete" interest because they alleged "various 'scientific, educational, aesthetic, recreational, spiritual, conservation, economic, and business interests' in the salmon" because "the basis of [the plaintiffs'] standing" is "the avoidance of harm to listed species." *See id.* at 1224–25, 1229.[6] The court then reasoned the ESA's procedures are designed to protect this interest:

> The § 7 consultation procedures in question—for example, the requirements that the [biological opinion] evaluate both the recovery and survival of listed species, and that RPA or reasonable and prudent measures are proposed—protect these concrete interests. See 50

[5] The plaintiffs' second claim alleged a substantive violation of the ESA. The claim challenged the agencies' "continued implementation of the treaty" under the ESA's "affirmative 'do-no-harm obligation' when [an agency's] actions could cause harm to an endangered species," which is "separate from" Section 7's procedural requirements. *Id.* at 1227. The third claim was based on the agencies' "fail[ure] to reinitiate consultation in light of new information." *Id.* at 1229–30.

[6] The court assumed, without holding, plaintiffs had a concrete interest with respect to the second claim.

> C.F.R. § 402.02 (defining, for purposes of ESA § 7(a)(2), to "jeopardize the continued existence" of a listed species); 16 U.S.C. § 1536(b)(3)(A) (requiring the proposal of RPA if jeopardy is found). These procedures are designed to advance the ESA's overall goal of species preservation, and thus the groups' specific goals as to salmon preservation, by ensuring agency compliance with the ESA's substantive provisions.

Id. at 1225–26.

Biological Diversity is highly similar. There, the challenged biological opinion concluded an agreement regarding groundwater pumping would not jeopardize the Moapa dace butterfly species in a particular refuge, and the plaintiff brought three claims: (1) the "no jeopardy" conclusion improperly considered conservation measures that were unenforceable; (2) the agency did not use the best data available because its conservation measures were negotiated, and therefore based on "expediency" rather than "science"; and (3) the opinion's conclusion that conservation measures were effective ignored concerns held by its own scientists. *Id.* at 1042–54. Relying on *Salmon Spawning*, the court found a concrete interest when the organization's "members have scientific, aesthetic, personal, spiritual and work-related interests in the continued survival of the Moapa dace and other species with habitats in the [refuge]." *Biological Diversity*, 807 F.3d at 1043. The court then reasoned "the consultation procedures of ESA are designed to protect" those concrete interests because the procedures "advance the ESA's overall goal of species of species preservation … by ensuring agency compliance with the ESA's substantive provisions." *Id.* at 1043–44 (citing *Salmon Spawning*, 545 F.3d at 1225–26).

So, applying *Better Forestry*, *Salmon Spawning*, and *Biological Diversity* here, Plaintiffs must demonstrate, for each claim asserted, (1) Plaintiffs' interests in species preservation are "concrete," and (2) "the procedures in question are designed to protect" those interests. *See Better Forestry*, 341 F.3d at 959. Plaintiffs have done so.

First, Plaintiffs have demonstrated concrete interests in species preservation. "Of course, the desire to use or observe an animal species, even for purely esthetic purposes, is undeniably a cognizable interest for purposes of standing." *Lujan*, 504 U.S. at 463. "Plaintiffs' members have educational, aesthetic, recreational, spiritual, conservation, and economic interest in many species, in areas affected by malathion, that are supposed to be protected by Section 7 of the ESA." (Dkt.

No. 58 at 18.) *Salmon Spawning* and *Biological Diversity* explicitly held those types of interests were "concrete." 545 F.3d at 1225, 1229; 807 F.3d at 1043. Further, Plaintiffs contend "[i]f ESA-listed species are allowed to decline based on the inadequate [biological opinion], Plaintiffs' interests will be harmed" because "[i]f FWS had conducted a sound consultation under the ESA those species and their critical habitats may have received sound additional protections." (Dkt. No. 58 at 18.) In other words, "the basis" of Plaintiffs' standing is "the avoidance of harm to listed species" resulting from a legally inadequate biological opinion. *Salmon Spawning*, 545 F.3d 1224–25, 1229.

Plaintiffs' members attest to these interests in many species and habitats. For example, Ms. Anderson, an employee and member of the Center for Biological Diversity, attests to a list of "aesthetic, conservation, recreational, scientific, educational, botanical and wildlife preservation interests" that are "adversely and irreparably injured" by the "flawed Endangered Species consultation process." (Anderson Decl. ¶¶ 32-33.) She has "studied and surveyed for native animals in California for over 32 years" and visited "vernal pool habitats" "as a consulting biologist from 1991-2004" and intends to visit the habitats again. (*Id.* ¶¶ 5, 30.) Ms. Burd, another employee and member, has performed surveys for butterfly species and authored petitions regarding pollinators, references the "Chiricahua leopard frog and Fender's blue butterfly" in Arizona and Oregon, and has "definite plans to continue to look for and enjoy these species [affected by malathion] in the states where I live and in my travels." (Burd Decl. ¶¶ 15-23.) In broad strokes, declarants attest to permutations of these interests across many species and habitats, with varying degrees of specificity.[7] The specificity and breadth of Plaintiffs' interests far exceed

[7] *See generally, e.g.*, Celano Decl. (attesting she is a "professional wildlife photographer" who visits "rivers, bays, and mangroves all around Florida" and the Everglades and who spends "330 plus days per year" taking photos and traveling to "the habitat of the species listed in this declaration"); Davis Decl. (referencing conservation work for the "Dakota skipper" and is worried about the overbroad maps the Service used in its consultation); Haskins Decl. (attesting to an interest in the Salt Creek tiger beetle and prior conservation and restoration employment in Montana, the Great Plains, the Rocky Mountains, and Nebraska); Hess Decl. (professor who teaches courses on biology and wildlife photography, "particularly photography of small animals and insects"); Irwin Decl. (attesting to an aesthetic, personal, and spiritual interest in mussels and Tennessee waterways); Nagano Decl. (avid butterfly watcher who also seeks out tiger beetles, such as the Ohlone tiger beetle and Miami tiger beetle); Miller Decl. (member of PANNA and CBD who has authored reports on pesticide's impacts on species and worked on conservation

those considered "concrete" in *Salmon Spawning* and *Biological Diversity*. *See generally* 545 F.3d at 1225–1229; 807 F.3d at 1042–43.

Second, each of Plaintiffs' arguments the Court reaches below rests on a consultation procedure designed to preserve species. Generally, like the first claim in *Salmon Spawning* and every claim in *Biological Diversity*, all of Plaintiffs' claims for relief are squarely rooted in the APA and ESA. (*See* Dkt. No. 1 ¶¶ 124-170 (labeling each claim for relief as a challenge to the opinion being "arbitrary or not in accordance with the ESA")); 545 F.3d at 1225; 807 F.3d at 1042–54. Plaintiffs' argument the opinion's "usage" analysis is arbitrary is both a "best available science" claim and an APA claim. (*See* Dkt. No. 58 at 28; Dkt. No. 75 at 15-18.) The ESA requires biological opinions be based on the "best available" science, which is a "§ 7 consultation procedure[] … designed to advance the ESA's overall goal of species preservation." *Salmon Spawning*, 1225–26. The Supreme Court has stated as much: the "*obvious* purpose of the requirement … is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise" which "*no doubt* serves to advance the ESA's overall goal of species preservation." *Bennett*, 520 U.S. at 176 (emphasis added). Plaintiffs' claim also relies, at least in part, on the argument the Service's jeopardy findings ignored evidence before the agency, and *Biological Diversity* explicitly addressed a claim for relief based on that argument after holding the plaintiffs had standing. *See* 807 F.3d at 1043–54. Plaintiffs' other arguments are the Service's critical habitat determinations used arbitrary categories to ignore available information about species and the determinations did not discuss recovery. *Salmon Spawning* held plaintiffs demonstrated a procedural injury regarding nearly identical arguments. *See* 545 F.3d at 1225 (describing the plaintiffs' arguments, including improper comparisons, "evaluat[ing] only a fraction of … populations," and studying impacts on some components of a population, but not others); *id.* at 1225–26 ("The § 7 consultation procedures in question–for example, the

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campaigns "for a wide array of imperiled wildlife species in California"); Whitsett Decl. (artist with a focus on aquatic species who references "the fountain darter and Comal Springs dryopid beetle" as examples and the "Edwards Aquifer," where she lives); Williams Decl. (author of 175 publications regarding mussel populations); Wood Decl. (director of a conservation non-profit with a special attention to North Carolina forests and researcher of birds in the Cape Fear River basin).

requirement[] that the [opinion] evaluate both the recovery and survival of listed species … protect[s] these concrete interests.").

Therefore, Intervenor-Defendant's argument "*Salmon Spawning* did not suggest that *any* allegation … would constitute a procedural injury" and Plaintiffs have not identified a particular consultation procedure (Dkt. No. 80 at 7) is unavailing. Intervenor-Defendant's argument imposes a far too narrow understanding of what constitutes a consultation procedure. *Salmon Spawning* gave two examples of such procedures: "[t]he § 7 consultation procedures in question" are "for example, the requirement[s] that the [opinion] evaluate … recovery … and that … reasonable and prudent measures are proposed." 545 F.3d at 1225–26. In other words, ESA requirements about what a biological opinion must say or consider are "consultation procedures" that, if violated, gives rise to an Article III procedural injury. That conclusion is consistent with *Biological Diversity*'s holding its plaintiffs suffered a procedural injury sufficient to confer standing over claims the biological opinion improperly considered certain information, did not use the best available data, and ignored the agency's own scientists. *See* 807 F.3d at 1043–54. So, the "§ 7 consultation procedure[s] in question" here are, for example, a biological opinion must use the best available data, make determinations with respect to species and critical habitats, and do so in ways that comply with the ESA and the APA. *See Salmon Spawning*, F.3d at 1225–26; *State Farm*, 463 U.S. 29, 43 (1983) ("[T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made.") (cleaned up).

So, Plaintiffs have demonstrated an injury to a procedural right. The Court next considers whether Plaintiffs' interest is concrete and particularized.

B. Plaintiffs Have Shown their Interests are "Concrete" and "Particularized"

"The fact that the [plaintiffs] are seeking to enforce a procedural right does not affect our injury in fact analysis; as in conventional standing cases, [Plaintiffs] must show the invasion of a concrete and particularized interest." *Cantrell v. City of Long Beach*, 241 F.3d 674, 679 (9th Cir.

2001).[8] That said, "plaintiffs raising procedural issues … need not show that the substantive environmental harm is imminent." *Id.* at 679 n.3 (quoting *Lujan*, 504 U.S. at 572 n.7 ("The person who has been accorded a procedural right to protect his concrete interests can assert that right without meeting all the normal standards for ... immediacy.")) In environmental procedural injury cases, a "concrete interest" requires a "geographic nexus between the individual asserting the claim and the location suffering an environmental impact." *Better Forestry*, 341 F.3d at 971 n.6.

The parties dispute whether Plaintiffs' interests are sufficient to challenge the biological opinion here, which covers the entire United States and virtually every endangered species and their critical habitat. Intervenor-Defendant asserts Plaintiffs' declarations "collectively mention only a small subset of the species addressed in the [biological opinion]. And the subset of species that are mentioned overlap even less with the species that are the subject of a specific allegation of error." (Dkt. No. 78 at 26.) Plaintiffs counter they have standing to challenge the biological opinion because they demonstrate "injury to their interests in a representative subset" of species. (Dkt. No. 75 at 28-29.) The Court agrees Plaintiffs have demonstrated a representative injury, *i.e.*, interests in a subset of species and habitats which are sufficiently representative to confer a concrete and particularized injury.

Plaintiffs rely on two cases: *Alaska Ctr. for the Envt. v. Browner*, 20 F.3d 981, 985 (9th Cir. 1994) and *Mont. Wildlife Fed'n v. Haaland*, 127 F.4th 1, 35 (9th Cir. 2025). In *Browner*, the plaintiffs challenged a policy affecting all waterways in Alaska, which covered an "estimated 3,000,000 lakes, 170,000,000 acres of wetlands, 365,000 miles of rivers and streams, and 36,000 coastal miles." 20 F.3d at 985. Given it would be a "heavy burden" for the plaintiffs to show they used every waterway, *Browner* held the plaintiffs demonstrated an injury in fact by showing they used a "representative number of waters throughout the state" and "injury throughout the entire

[8] Although *Cantrell* interprets the National Environmental Protection Act, the concrete interest test applies "equally" to ESA cases. *See Citizens*, 341 F.3d at 971 n.6 ("The *Cantrell* case, like many other Ninth Circuit cases addressing similar issues, dealt only with claims under NEPA. Here, Citizens assert violations of the procedural aspects of both NEPA and ESA. Thus, although many of the cases cited in this section speak of NEPA specifically, the analysis is equally applicable to claims of **any procedural environmental injury** (e.g., failure to conduct sufficient environmental analysis) under *Lujan*.)) (emphasis added).

area for which they seek relief," which was "sufficient to present the legal questions at issue in a 'concrete factual context' of water pollution in Alaska, as the standing requirement is meant to ensure." *Id.* at 985–86. In other words, *Browner* emphasized representativeness in terms of "number" and "area for which [the plaintiffs] seek relief." *Id.* Additionally, the *Montana Wildlife* plaintiffs challenged Bureau of Land Management ("BLM") policies governing five lease sales across three states, which covered "677 leases on 900,070 acres of land." 127 F.4th at 23. In a brief section of the opinion, the court held the plaintiffs showed a sufficient injury-in-fact because "our caselaw does not require plaintiffs to show harm tied to each parcel on which a lease was granted," and the plaintiffs challenged the "broadly applicable BLM policies that cover some areas their members use and enjoy, resulting in lease sales in various locations." *Id.* at 23, 35.

Intervenor-Defendant primarily relies on *Ecological Rights Foundation v. Pac. Lumber Co.*, 230 F.3d 1141, 1147 (9th Cir. 2000). *Ecological Rights* interpreted several environmental standing cases, including *Lujan v. Defenders of Wildlife*, 504 U.S.; *Lujan v. National Wildlife Federation*, 497 U.S. 871 (1990); and *Friends of the Earth v. Laidlaw*, 528 U.S. 167 (2000). Contrasting these cases, *Ecological Rights* reasoned:

> The 'injury in fact' requirement in environmental cases is satisfied if an individual adequately shows that she has an aesthetic or recreational interest in a particular place, or animal, or plant species and that that interest is impaired by a defendant's conduct. […] Because the plaintiffs in [both *Lujan* cases] failed to show any tangible, continuing connection to any particular location affected by the challenged decision, they could not assure that the legal questions presented to the court will be resolved … in a concrete factual context[.]" *Laidlaw*, on the other hand, involved a situation, like this one, in which the litigation was narrowly focused [to an incinerator near a river] and the plaintiffs' allegations of injury quite specific. […] [*Laidlaw* found standing where] members of the plaintiff organizations … use the affected area and are persons for whom the aesthetic and recreational values of the area will be lessened by the challenged activity.

230 F.3d at 1149 (cleaned up). Ultimately, *Ecological Rights* held these cases allow a "flexible approach" to evaluating a plaintiff's injury in fact in environmental cases. *Id.* at 1150. Plaintiffs must "show[] a connection to the area sufficient to make credible the contention" their interests are harmed. *Id.* at 1149. Relevant factors include, but are not limited to, "residential contiguity," "frequency of use," "[d]aily geographical proximity," and "[r]epeated recreational use itself,

accompanied by a credible allegation of desired future use, can be sufficient, if relatively infrequent[.]" *Id.* at 1149. These factors "are not to be evaluated in a one-size-fits-all, mechanistic manner." *Id.*

So, *Ecological Rights* does not support Intervenor-Defendant's argument Plaintiffs must show an interest in every species affected by a decision; *Ecological Rights* requires an interest in "a particular place, or animal, or plant species" supported by facts sufficient to make a claimed standing injury "credible" and place the issues surrounding the challenged decision in a "concrete factual context." 230 F.3d at 1149–50. So, to the extent Plaintiffs only reference a "small subset" of species (Dkt. No. 78 at 26), that is not fatal to Plaintiffs' standing because the interests in that "subset" may be sufficiently credible and indicative of the issues at play.

Applying *Ecological Rights*, *Browner*, and *Montana Wildlife* here, the question is whether Plaintiffs have placed the issues in a "concrete factual context" for adjudication by (1) demonstrating a sufficient connection to endangered species, and/or (2) showing interests in species that are sufficiently representative in number and geography to the species identified in the biological opinion.

On the first point, there is little doubt Plaintiffs' members have deeply felt, long-standing connections with endangered species in areas affected by malathion such that it is "credible" they will continue to visit these species and their interests in the species will be harmed. *Ecological Rights*, 230 F.3d at 1149–50; (*see generally, e.g.*, Anderson Decl. (attesting to 13 years of work as a consulting biologist for vernal pool habitats); Burd Decl. (attesting she authored surveys and petitions for monarchs and pollinators); Celano Decl. (attesting "I work as a professional wildlife photographer in Florida. … I spend 330 plus days per year outside" photographing species).)

The question, then, is whether Plaintiffs' members' asserted interests cover a sufficiently representative group of species and habitats. Plaintiffs' declarants reference dozens of endangered species and their habitats. Mr. Miller, for example, attests "I go birdwatching every day. In the last two decades, I have seen 541 different species of birds in California alone." (Miller Decl. ¶ 17.) Mr. Miller also attests to an interest in numerous taxonomic categories: "I have worked on conservation campaigns for a wide array of imperiled wildlife species in California, including

native fish, birds, raptors, amphibians, reptiles, carnivores, ungulates, rodents, insects and plants." (*Id.* ¶ 14.) Mr. Miller has authored reports regarding, signed ESA listing petitions about, and led or worked on restoration and conservation campaigns for at least 23 species. (*See id.* ¶¶ 6-14.) Additionally, Mr. Miller's declaration has a section devoted to the valley elderberry longhorn beetle where, among other things, he declares he has visited regions "in search of" this beetle four times since 2016 "and plan[s] to continue to search for the beetle in future trips in 2026." (*Id.* ¶ 33.) Plaintiffs' motion specifically highlights this beetle species as an example of the biological opinion's erroneous reliance on overbroad range estimates. (*See* Dkt. No. 58 at 24-25.) Accordingly, Mr. Miller's interests alone are sufficiently credible to place the Service's species and critical habitat determinations, including those regarding the valley elderberry longhorn beetle, in a "concrete factual context." *Ecological Rights*, 230 F.3d at 1149–50.

Finally, although much of Mr. Miller's interest lies in California-based species, the species and habitats referenced in other declarations are representative of the rest of the United States. (*See generally, e.g.*, Burd Decl. ¶¶ 14-24 (attesting she lives in Arizona and Oregon, and frequently visits monarchs in Oregon and frogs in Arizona); Celano Decl. ¶ 4-15 (photographer in Florida who regularly visits the Everglades); Haskins Decl. ¶ 5 (co-founded a conservation institute in Montana and worked in Nebraska); Irwin Decl. ("I live next to the Tennessee river" and "intend to keep visiting waterways in Tennessee for years to come, for both professional and personal reasons"); Wood Decl. (employee at a conservation non-profit with special attention to North Carolina forests).) Under the flexible approach of *Ecological Rights*, Plaintiffs' interests are sufficiently representative of the geography and types of habitats covered by the biological opinion such that Plaintiffs have placed the issues in a concrete factual context.

Given Plaintiffs have demonstrated an injury to a concrete and particularized interest, they have satisfied Article III's injury-in-fact requirement.

C. Plaintiffs Have Demonstrated Causation and Redressibility

"A showing of procedural injury lessens a plaintiff's burden on the last two prongs of the Article III standing inquiry, causation and redressibility. Plaintiffs alleging procedural injury must show only that they have a procedural right that, if exercised, *could* protect their concrete

interests." *Salmon Spawning*, 545 F.3d at 1226 (cleaned up) (emphasis in original). "Plaintiffs alleging procedural injury can often establish redressibility with little difficulty, because they need to show only that the relief requested—that the agency follow the correct procedures—*may* influence the agency's ultimate decision of whether to take or refrain from taking a certain action." *Id.* at 1226. (cleaned up) (emphasis added).

Salmon Spawning held its plaintiffs established causation and redressibility for their third claim (failure to reinitiate consultation), but not their first claim (arbitrary jeopardy analysis).[9] There, "[t]he agency action that the [biological opinion] authorized was the United States' entrance into the Treaty" with Canada. 545 F.3d at 1227. For the first claim, the plaintiffs did not demonstrate causation and redressibility because even if the court ordered a new Section 7 consultation process, "the ultimate agency decision of whether to enter into the Treaty with Canada, made nine years ago, could never be influenced" because courts "cannot undo the Treaty." *Id.* at 1226–27. By contrast, if the court ordered a new consultation process, then reinitiation may ultimately benefit the groups "for example, by resulting in a 'jeopardy' determination[.]" *Id.* at 1229. "Unlike the other claims," the failure-to-reinitiate consultation claim "is a forward-looking allegation whose remedy rests in the hands of federal officials and does not hinge on upsetting the Treaty." *Id.*

Here, Plaintiffs have established redressibility and causation. Of the claims the Court reaches below, Plaintiffs challenge the Service's explanation for the data and range estimates underpinning the jeopardy determinations, the categorization scheme underpinning the critical habitat determinations, and the failure to consider recovery. A court order vacating the species' jeopardy and critical habitat determinations on those grounds "*could*" protect Plaintiffs' interests in species preservation "for example, by resulting in a 'jeopardy' determination," a determination of destruction or adverse modification, or species-specific conservation measures. *Id.* at 1229. Additionally, vacatur "may influence" the EPA's "ultimate decision as to whether to" approve

[9] The causation and redressibility analysis for the second claim, which alleged a violation of a substantive "do-no-harm" obligation in the ESA, hinged on a review of the treaty's provisions, and are not relevant to Plaintiffs' argument here. *See Salmon Spawning*, 545 F.3d at 1228.

malathion for nationwide use. *See id.* at 1226–27 (noting the agency action evaluated by the biological opinion "could never be influenced"); *Biological Diversity*, 807 F.3d at 1044 (finding redressibility because a new consultation "may influence" the agency action: the decision to execute an agreement regarding groundwater pumping); *Natural Res. Def. Council v. Jewell*, 749 F.3d 776, 783 (9th Cir. 2014) (en banc) ("Because Plaintiffs allege a procedural violation under Section 7 of the ESA, they need only show that, if the Bureau engages in adequate consultation, the DMC Contracts *could* better protect Plaintiffs' concrete interest in the delta smelt than the contracts do currently.")

Intervenor-Defendant's arguments to the contrary are unavailing. First, Intervenor-Defendant contends Plaintiffs' claims "lack … a sufficiently clear statement of how Plaintiffs' alleged injuries are traceable to deficiencies alleged in the [biological opinion] and thus plausibly able to be redressed, as Article III requires." (Dkt. No. 73 at 34.) Not so. Plaintiffs' motion states their "right to a procedurally sound consultation, … if exercised, 'could' protect their interests … because[] if [the Service] follows correct procedures on remand, it may be influenced to take actions to minimize harms to those interests." (Dkt. No. 58 at 19.) Intervenor-Defendant's only cited case on this point, *Friends of Animals v. U.S. Fish & Wildlife Serv.*, 789 F. App'x 599, 600 (9th Cir. 2020), is unpublished. Given the low bar required of Plaintiffs, and Plaintiffs' statement matches the level of generality at which *Salmon Spawning* applied redressibility and causation, Plaintiffs need not make a more detailed statement than that. Second, Intervenor-Defendant claims *Salmon Spawning* "emphasized that the focus of the redressability analysis was the State Department's action, not the [biological opinion] itself." (Dkt. No. 80 at 7.) True, *Salmon Spawning* emphasized the treaty in analyzing the plaintiffs' first and second claims, but the court did not do so for the third claim. *See* 545 F.3d at 1225–27. The third claim, and Plaintiffs' claims here, are "forward-looking" such that a court order "could" result in different determinations or influence the EPA's decision to re-register malathion. *See id.*

Accordingly, the Court finds Plaintiffs have demonstrated Article III standing for the claims reached below.

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II. The Jeopardy Determinations' "Usage" Analysis is Arbitrary

Plaintiffs first argue the biological opinion's jeopardy analysis is arbitrary because the "usage" analysis is arbitrary.[10] As explained above, "usage" is expressed as a percentage of anticipated malathion usage across the species' range, and this percentage is one of three factors underlying every jeopardy determination.

Plaintiffs take issue with both the numerator (anticipated pesticide usage) and the denominator (species' range) of the "usage" factor. Regarding the denominator, Plaintiffs contend the Service "often used vastly inflated estimates of species' ranges even when it possessed data that demonstrated a much smaller range," the opinion relied on "outdated range maps," and for "all … listed species, there is nothing in the record that explains how … range estimates w[ere] generated." (Dkt. No. 58 at 20, 24.)

As for the numerator, Plaintiffs contend the Service's "failure to explain why it chose to design its effect analyses to rely so heavily on … usage data, despite its known limitations, was arbitrary and capricious." (Dkt. No. 75 at 17-18.) Plaintiffs style this as an APA claim and a "best available science" claim based on the National Academy of Science's recommendations regarding data quality, intended use of data, and pesticide application rates. The Service's decision to rely on usage data therefore "runs afoul of a rational basis" because it "borders on speculation when it uniformly utilized deficient data to extrapolate pesticide usage overlap." (Dkt. No. 58 at 28.) Defendants respond the usage data is "the best available scientific and commercial data" regarding "historical patterns of how and where malathion is applied," and, after making assumptions to extrapolate from the data, the Service can "better predict" where malathion effects are "reasonably certain to occur." AR-357; AR-12297-98; AR-12506 (quoting 50 C.F.R. § 402.02 and 16 U.S.C. § 1536(a)(2)); *see also* AR-12416 ("We anticipate these assumptions reasonably estimate how many acres are likely to be treated with malathion in a single year[.]"). Thus, Defendants assert

[10] Plaintiffs refer to the "usage" factor as "overlap." (Dkt. No. 58 at 19.) The Court uses the phrase "usage" because the biological opinion distinguishes between "use" and "usage." Plaintiffs' claim describes limitations with the usage data, e.g., commercial surveys, and invoke the National Academy of Sciences' recommendation regarding pesticide application rates, which is about how malathion is actually applied on the landscape. Plaintiffs do not challenge the use data, e.g., crop land data from the U.S. Department of Agriculture.

they need not acquire or make new data.

As explained below, the Court agrees the biological opinion's "usage" analysis is arbitrary because it relies on arbitrary, often inflated species' range estimates and does not offer a satisfactory explanation for its reliance on pesticide usage data. Given every "no jeopardy" finding relies on the "usage" analysis, the Court finds the "no jeopardy" findings are arbitrary, capricious, and not in accordance with the law.

A. The Species' Range Estimates Are Arbitrary

The biological opinion's species' range estimates, and by extension the calculations underlying the "usage" factor in every jeopardy analysis, are arbitrary for two reasons. First, the opinion does not explain how it derived an estimate, in acres, of a species' range, aside from a purported process of collecting maps. Second, some species' range estimates appear overbroad, without a satisfactory explanation as to their breadth.

First, the biological opinion refers to the Service's "reliance on current ranges for each species that may not accurately reflect the species' actual distribution within those mapped ranges," and highlights this reliance is "[o]ne of the main uncertainties within the analysis." AR-12473. While the Service alludes to "mapped ranges" and a process of "collection of current range maps," nowhere in the opinion is there an example of a mapped range or an explanation of this "collection" process except "we requested that Service Field Offices provide refined current range maps *if available*" and "*in some cases* … we were able to refine … existing current range maps … based on the best scientific and commercial data available at the time." *Id.* (emphasis added); *see generally* AR-12559-12612; 12692-26706 (Appendix C); 26819-30762 (Appendix K). The opinion does not have an example of a mapped range, a link to a mapped range that existed at the time of the Service's analysis, or an explanation of the process of how the Service "refined" maps, let alone an explanation of what "scientific and commercial data" was used to refine maps. *See generally id.*

Defendants' briefing does not supply these missing explanations, either. Defendants explain:

> [The Service] used larger range estimates from its [ECOS website],

> then narrowed those down with more refined, current maps from Field Offices where available. AR-12516, 12692, 26822, 29995–96, 30210, 30303, 42668; *see* AR-563, 580, 582, 1147, 1162; *see also* AR-12473. These broader ECOS maps, used as a starting point, often identified full counties as a potential range. *Id.* Then [the Service] incorporated more specific data to pinpoint a species' distribution within the range where possible. *Id.* For example, where feasible, [the Service] used environmental variables like habitat and elevation to develop species distribution models. *See* AR-1525 (refining based on certain life history traits, such as fossorial behaviors (e.g., burrowing), location of important geographic areas (e.g., breeding sites such as leks), and the likelihood of individuals entering pesticide usage sites.") [The Service] used its range calculations to estimate percentage overlaps; then, importantly, [it] analyzed each specific species, considering species' life histories and individual characteristics in each determination.

(Dkt. No. 70 at 24-25.) So, Defendants rely on the following citations to the administrative record: AR-563, 580, 582, 1147, 1162, 12473, 12516, 12692, 26822, 29995–96, 30210, 30303, and 42668. None of Defendants' citations provide an example of a mapped range that existed as the Service conducted its analysis, an explanation of how the Service collected maps, or details about the process of refining maps. Crucially, a reader must go beyond the opinion to find this information, by searching either the Service's website[11] or making unsupported inferences from

[11] The opinion repeatedly refers to the Service's website: the "Environmental Conservation Online System" ("ECOS"), found at: https://ecos.fws.gov/ecp/. *See, e.g.*, AR-12516 (explaining this website contains the "listing and recovery documents" upon which the Service relied to "capture important species-specific considerations"); AR-12692 (Appendix C cover page); AR-26820 (Appendix K cover page). Notably, these record citations do not explain this website is where range maps are found. Additionally, Appendix C and Appendix K contain narratives and jeopardy analyses for each species, but they do not show these maps or link to a map that was used to estimate, in acres, the species' ranges. *See generally* AR-12692-26706; AR-26819-30762. The only place in the entire biological opinion where the Court could locate a hyperlink to a species map, without conducting an independent search on the ECOS website, is the cover page for Appendix C. AR-12692-93. The cover page has hyperlinks to the ECOS pages for 15 "proposed or recently listed species." *See* AR-12693. But Appendix K explains the range maps in these 15 hyperlinks did not exist at the time the Service conducted its analysis. *Id.*; *see, e.g.*, AR-27857 (stating range maps for Lesser prairie-chicken, a proposed threatened bird species in the Appendix C cover page, were not available at the time). Despite not having a range map for the species, the Service ranked the usage factor for the Lesser prairie-chicken as "low," based on past usage data because:

> We estimate up to 5% of developed and open space developed within the species range could undergo some level of malathion. However, given the habitat preferences of the [species] and limited utilization of these use sites, this is likely to represent a low percentage of the species range overall. For mosquito adulticide, data indicated past usage of malathion in 10 of the 57 counties in Colorado, Kansas, Oklahoma, and Texas that encompass the recovery units of the lesser

the broader administrative record. Of Defendants' citations to the administrative record,[12] only two contain maps of any kind, and these maps do not show an individual species' range. For

> prairie-chicken. Data indicate that sales or usage in these counties occurred only once or twice in these counties for the 5 years of data available.

AR-27856-57.

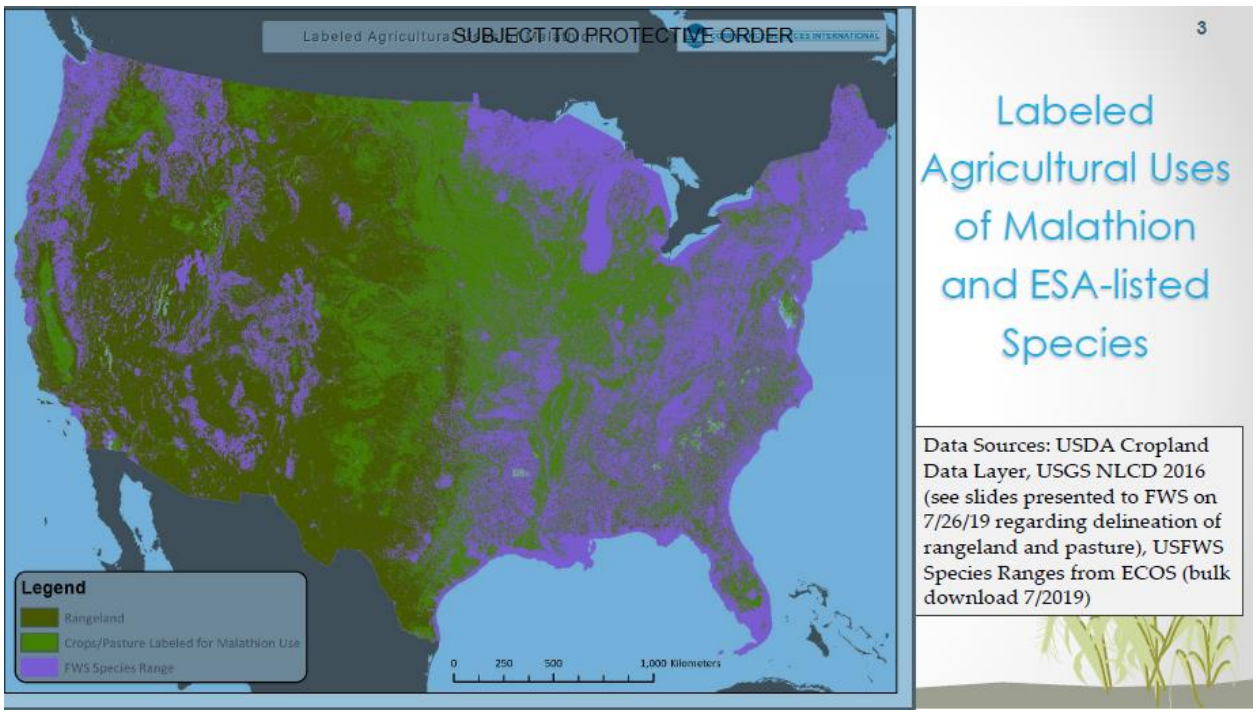
[12] Defendants' "*see also*" citation to AR-12473 are the two paragraphs quoted above referencing the "collection" of maps.

Six citations (AR-12516, 12692, 26822, 29995–96, 30210, 30303) are to portions of the biological opinion which contain hyperlinks to ECOS, but in order to locate a range map using the hyperlinks in these citations, the reader must conduct an independent search on the ECOS website. *See* AR-12516 (linking to the ECOS website homepage, not a species profile); AR-12692 (Appendix C cover page, which contains hyperlinks to range maps that did not exist at the time the Service conducted its usage analysis); AR-26822 (linking to ECOS website homepage), 29995–96 (same), 30210 (same), 30303 (same). At the hearing, Plaintiffs noted the ECOS website contains an instruction telling users to not rely on these maps for Section 7 consultation, but the Court cannot verify this claim or the legal significance of this instruction without conducting an independent search of the ECOS website.

Defendants' citation to AR-42668 is the EPA's Biological Evaluation, explained above, which says "[t]he FWS requested from the species experts in their Regional and Field Offices the most refined range data … for all listed species under their jurisdiction. […] The species ranges were provided in the form of a GIS spatial file[.]" AR-42668. Presumably, the Service used a similar GIS method to map species ranges, and perhaps performed a co-occurrence analysis similar to that of the EPA's Biological Evaluation, but it appears the Service relied on different maps than the EPA because the biological opinion acknowledges "internal Service efforts to refine species ranges, and in some cases … we were able to refine and improve many of the existing current range maps." *See* AR-12473. So, Defendants' citation to the EPA's Biological Evaluation does not illustrate a species range map or explain the Service's refinements.

Defendants' remaining citations ("*see* AR-563, 580, 582, 1147, 1162" and "*see* AR-1525") are to the administrative record. In other words, none of these citations are in the biological opinion. Additionally, these citations do not explain the species' range estimates. AR-1147 and AR-1162 are the only cited pages that contain maps of any kind, but these maps do not show individual species' ranges, how the agency derived an estimate of each species' range, or the Service's refinements to maps. The maps also were not generated by the Service. The first three citations in that group–AR-563, AR-580, and AR-582–are part of the administrative record reflecting the Service's consultation with the American Mosquito Control Association. These cited pages were not generated by the Service, nor do the pages contain maps of species ranges; the pages appear to reflect GIS data analysis performed by the American Mosquito Control Association regarding overlap between mosquito adulticides and <u>*critical habitats*</u>. *See generally* AR-563-582. The last citation in that group, AR-1525, is a memorandum which says "[a] number of species range refinements are already completed …" and, again, this memo does not explain what those refinements entailed, except that they "now represent the best available scientific and commercial information available [sic]." *See* AR-1525. Additionally, Defendants cite AR-1525 as an example of "refinements … based on certain life history traits," but this sentence is referring to examples of "refinements to species exposure" to malathion, not to refinements of species range maps. *See id.* "Exposure" is considered under the "risk" factor, whereas the range maps are considered under the "usage" factor.

example, as part of the consultation, the American Mosquito Control Association attached the following map in an email to the Service:



AR-1147. Neither cited map was made by the Service, and both maps purport to visualize every species' range in the aggregate, as opposed to a map of one species that can be converted into a range estimate, in acres. *See id.*; AR-1162.

So, based on Defendants' briefing, one could surmise the biological opinion's "usage" analysis used a similar methodology as the EPA's Biological Evaluation's co-occurrence analysis. *Compare* AR-42668 (the EPA explaining "[t]he FWS requested from the species experts in their Regional and Field Offices the most refined range data" and "[t]he species ranges were provided in the form of a GIS spatial file"), *with* AR-12473 (the biological opinion explaining "[d]uring the collection of current range maps for these consultations, we requested … refined current range maps if available. Additionally, through internal Service efforts to refine species ranges … we were able to refine and improve many of the existing current range maps[.]"); *see also* AR-1147 (including "USDA Cropland Data Layer" as a data source and referring to a "bulk download" of species ranges in July 2019). But if that is the case, the biological opinion does not say so. Nor do Defendants' citations to the administrative record explain the extent to which the Service may have deviated from the EPA's co-occurrence analysis because the opinion does not state whether the Service used the same maps or refined versions, the same GIS spatial file, the same software, or the same co-occurrence method of counting pixels. Therefore, the biological opinion's species' range estimates are arbitrary because "the agency's path" in calculating those estimates cannot "reasonably be discerned." *State Farm*, 463 U.S. at 43 (quoting *Bowman Transp. Inc. v. Arkansas-Best Freight System*, 419 U.S. 281, 286 (1974)). "The reviewing court should not attempt itself to make up for such deficiencies: we may not supply a reasoned basis for the agency's action that the agency itself has not given." *State Farm*, 463 U.S. at 43.

Separately, some species' range estimates are arbitrary because they are overbroad and lack a satisfactory explanation in the record for their breadth. Plaintiffs identify several instances of overbroad species' estimates, including the valley elderberry longhorn beetle. The beetle's species profile in Appendix C provides scattered references to the species' range, as well as indications about how one could pinpoint the species' range, including:

- The species "feeds almost exclusively" on elderberry plants and "requires the riparian

moist woodlands in which the plant grows." AR-16861.

- The species "has been collected in four central California counties" and there are "190 records of the animal … in the Central Valley," but records from Kern County do not "support the assertion the species is found there." *Id.*
- The species' "entire historical distribution … is unknown," but "extensive destruction of riparian forests of the Central Valley during the past 150 years strongly suggests that the beetle's range has decreased and become greatly fragmented." *Id.*
- "Four of the five counties (Fresno, Kern, Tulare, and Madera) that have the greatest pesticide use in California are in the San Joaquin Valley, where approximately 33 percent of beetle occurrences are documented." AR-16866-67.
- Occupancy of the valley elderberry longhorn beetle within the presumed historical range over the past 16 years has occurred in approximately 18 hydrologic units and 36 geographical locations in the Central Valley. AR-16865.
- "One of the elderberry species on which the beetle depends is well adapted to warm temperatures, and extends its range into southern California and northern Mexico." AR-16866.

Additionally, the species' 2019 recovery plan indicates "102,000 acres of riparian forest," a habitat which the species' host plant requires, "remained in the Central Valley in 1984." (Dkt. No. 60-1 at 95.) The recovery plan also notes the species "is distributed through available habitat in a widely dispersed metapopulation" and "continues to persist throughout its historic range." (Dkt. No. 70-1 at 6, 12.)

Yet, inexplicably, the "Integration and Synthesis" summary estimates the species' range is 9,450,948 acres. AR-29114. The summary, like all others in Appendix K, does not have an explanation for how the Service calculated this large number or refined a map that would illustrate this number. *Id.* As support for the beetle's estimate, Defendants offer three explanations; none is included in the biological opinion and, in any event, none explain how the agency derived such a large, specific range estimate of 9,450,948 acres.

First, Defendants emphasize evidence in the record the species "is distributed through

available habitat" and "continues to persist throughout its historic range." (Dkt. No. 70 at 25 (quoting Dkt. No. 70-1 at 6, 12).) But this does not supply an explanation as to how the Service derived an estimate of 9,450,948 acres because information in the record is contradictory about the beetle's range; Appendix C highlights several studies showing examples of how scientists evaluate evidence of the species' range, yet the Appendix K summary does not even attempt to explain how the Service evaluated this conflicting evidence. AR-29114; *see, e.g.,* AR-16861 (noting the species' "entire historical distribution is unknown" and evidence "strongly suggests" the beetle's range had decreased); *id.* (noting some records of the beetle do not "support the assertion the species is found there"); AR-16866-67 (noting "33 percent of beetle occurrences are documented" in four counties). It bears repeating: every range estimate in Appendix K consists of just a number, in acres. As exemplified above, a species' "usage" analysis literally has no words explaining the estimates:

> **# acres in species range:** 9,450,948 acres
> **% of range in California (i.e., where CalPUR data is available):** 100%
> **Range overlap with Federal lands:** 197,986 acres, 2.09%

AR-29114.

Second, Defendants assert every refined map reflects "the best available scientific and commercial data available [sic]." *See* AR-1525. But a biological opinion "complies with the best available science standard so long as it does not ignore available studies." *Locke*, 776 F.3d at 995. And here, the beetle's "usage" analysis does not discuss the available evidence in Appendix C which, according to the biological opinion's own evaluation, "strongly suggests" the beetle's range is decreasing and fragmented. *See* AR-16861-67. In addition to not complying with the best available science standard, the range estimates are arbitrary because they ignore contrary evidence in Appendix C, which the Service wrote. *Cf. Idaho Sporting*, 305 F.3d at 957, 967-70, 71-73 & n.5 (setting aside an environmental assessment because the agency's "own scientists" wrote a report criticizing the agency's methodology for estimating, in acres, certain forest populations); *Gifford*, 378 F.3d at 1066 & n.4 ("While the statute[] at issue [in *Idaho Sporting*] may be different, the principle [behind deference to an agency's methodology] … is equally applicable in the ESA context").

Relatedly, Defendants' only citation for its argument the maps reflect the best available data is AR-1525, which is a memo not referenced in the biological opinion and does not identify the "best available" data, explain what the data reflects, or articulate the process of defining a range based on that data. *See* AR-1525. True, "the determination of what constitutes the best scientific data available … warrants substantial deference. *Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency*, 966 F.3d 893, 925 (9th Cir. 2020). But Defendants' citation does not identify what the data is, so there is no "determination of what constitutes the best scientific data available." *Id.* Additionally, the Service's failure to even identify the data contradicts the National Academy of Science's recommendations regarding "best available data," which Defendants do not address. *See* AR-186-87 (stating "[o]ne of the critical tasks in any risk assessment is to identify the data" and agencies "need to" "document the evaluation of all data used"). Those recommendations are also consistent with the purpose of the "best available science" requirement: "to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise." *See Bennett*, 520 U.S. at 176. So, the Court cannot defer to Defendants' range estimates on the unsupported basis the maps reflect the best available data.[13]

Third, at the hearing, Defendants clarified the maps:

> Also took into account recovery plans and things of that nature to where the species <u>*could potentially occur*</u>. … For example, there's a lot of developing area where Fish and Wildlife Service […] is just unsure if the species is there. […] They had to include these underdeveloped and non-developed areas because otherwise, the Service could be discounting the range of the species, and [the Service] can't do that.

(Cross-motion hearing recording at 22:32-23:07) (emphasis added). To the extent Defendants' maps estimate "where the species could potentially occur," the range maps are arbitrary. For starters, the statement "where the species could potentially occur" or any variation is not in the

[13] The record also calls into question whether the maps reflect information in Appendix C, and whether that information is the "best available." The appendix states it is "in draft form," was prepared by "consultants" and "staff," "has yet to be reviewed and finalized by U.S. Fish and Wildlife Service species experts," and therefore "may not necessarily encompass the information that is available or known by species leads or the most recent knowledge regarding the species." AR-12692. Every page of Appendix C says "DRAFT – For Review" at the top. AR-12694-19228.

biological opinion. *See generally* AR-12274-12612. Nor is there an explanation in the record as to how the Service could estimate an exact figure of where a species "could potentially occur," especially for a beetle species whose "entire historical distribution is unknown" and whose current range has decreased over time with the destruction of riparian forests. *See* AR-16861-67. So, if anything, Defendants' maps defeat their "best available science" argument because an estimate of where beetles "could potentially occur" invites "speculation or surmise," *Bennett*, 520 U.S. at 176, and "ignore[s] available biological information" their own scientists wrote. *Kern Cnty. Farm Bureau v. Allen*, 450 F.3d 1072, 1080–81 (9th Cir. 2006).

Defendants' explanations for the range estimates are therefore arbitrary in several respects. Broadly, the Service's failure to explain how it derived range estimates based on voluminous, often contradictory, species profiles and Service-generated documents means "the agency's path [cannot] reasonably be discerned." *State Farm*, 463 U.S. at 43 (cleaned up); *cf. Tucson Herpetological Soc. v. Salazar*, 566 F.3d 870, 878-79 (9th Cir. 2009) (reversing an agency's determination because the agency "affirmatively relie[d] on ambiguous studies" about a lizard persisting throughout its historic range and "[t]he studies do not lead to the conclusion" proffered). And if the Service's "usage" factor estimates where malathion's usage overlaps with places a "species could potentially occur," as opposed to where the effects of the action are "reasonably certain to occur," then the biological opinion is "not in accordance with" 50 C.F.R. § 402.02 and the Service "has relied on factors which Congress has not intended it to consider." *State Farm*, 463 U.S. at 43. Finally, as the beetle species' estimate illustrates, Defendants' explanation for its species' range estimates "runs counter to the evidence before the agency, or so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Id.*

Accordingly, the biological opinion's species' range estimates are arbitrary, capricious, and not in accordance with the law.

B. The Opinion's Reliance on Non-California Pesticide Usage Data is Arbitrary

The Service defends its use of pesticide usage data on the basis federal regulations require the Service to identify the "effects of the action" that are "reasonably certain to occur. *See* AR-356-67; 12297-98, 12506 (quoting 50 C.F.R. § 402.02). "An effect is reasonably certain to occur

if its occurrence is based on 'clear and substantial information,'" as opposed to "'speculation or conjecture.'" *Haaland*, 87 F.4th at 989 (quoting 50 C.F.R. § 402.17(b) (2019) and 84 Fed. Reg. 44,977). The Service's analysis "must do more than rely on speculation sprinkled with dabs of evidence," *id.*, and offer a "satisfactory explanation" for its decision to rely on pesticide usage data. *Bureau of Land Mgmt.*, 141 F.4th at 1013 (quoting *State Farm*, 463 U.S. at 43). "At bottom" the biological opinion must "'rationally explain why it did what it did.'" *Id.* at 1014 (quoting *In re Big Thorne Project*, 857 F.3d at 976).

Here, the Service's jeopardy determinations rely on conclusions about where, in species' ranges, malathion's usage is "reasonably certain to occur." The Service explains it "is not realistic to assume [malathion] will be used in every location in the action area where labeled uses allow." AR-12297. So, rather than assume malathion will be used everywhere, the Service considered usage data because the data "represents historical patterns of how and where malathion is applied on the landscape." *Id.*

It is this explanation–the usage data "represents historical patterns" such that the Service is "reasonably certain" about where malathion is applied–that is unsatisfactory, and renders the "usage" analysis arbitrary. The usage data has significant limitations, coupled with assumptions that defeat the purposes for which the data is used, making the Service's overlap calculations based on "speculation or conjecture," not "clear and substantial information." *See Haaland*, 87 F.4th at 989. For the survey data outside of California's CalPUR data, Defendants could not even "determine an adequate sample size." *Id.* Yet the Service specifically "extrapolated" from this data to predict the locations of actual pesticide usage when no data was available, AR-12416, even though the non-California data did not have "statistical foundation to understand the robustness at [even] the state level or any geographic specificity at the sub-state level." AR-12409. Worse, the Service then overlayed its extrapolation with species range maps that "[o]ften" "defined" ranges "as entire counties or smaller subunits"–the exact geographic specificity for which the usage data was not considered robust. AR-12473.

Additionally, the biological opinion does not even attempt to explain how the usage data is consistent with the National Academy of Science's recommendations about what Defendants

"need to … follow[] … for a credible assessment." AR-186. The report cautioned "the Service[] cannot reasonably be expected to use information that suggests that substantially lower application rates [of pesticides below the maximum allowable rate] are used unless … data … include[s] statistical descriptions of the spatially and temporally distributed application rates." AR-249. The non-California usage data is nationwide in scope and does not contain "statistical descriptions of the spatially and temporally distributed application rates," *id.*, because the data did not have the "statistical foundation to understand the robustness at [even] the state level or any geographic specificity at the sub-state level." AR-12409. Defendants also do not attempt to explain how their "assumptions" about and extrapolations from the usage data, which inherently predict lower rates of malathion application than the maximum allowable rate, satisfy this recommendation.

Moreover, per the report, data is considered the "best available data" when Defendants "screen the data first for relevance" to ensure data is used for its "intended purpose" and the data is "applicable to the locations being considered[.]" *Id.* (cleaned up). Defendants have not offered a satisfactory explanation for how it deployed its usage data because it does not address these recommendations. Regarding the data's intended purpose, the biological opinion expressly acknowledges "[t]he majority" of non-California data was "designed" for two purposes: (1) "to address market questions asked most often by senior executives" and (2) "to reach a particular percentage of total crop grown *at the national level*[.]" AR-12409-10 (emphasis added). Yet Defendants deployed that data for purposes for which it was not intended: (1) to locate where malathion has historically applied on the landscape, (2) to extrapolate actual use to areas not covered by existing data, and (3) to predict where, over the next 15 years, malathion's application will overlap with specific counties or sub-units. *See* AR-12409-15; 12473; *see also* AR-12423 ("To our knowledge, this information has not previously been used for estimation of ecological risk."). Relatedly, given the usage data does not measure malathion's usage at the county or sub-county level, the data is not "applicable to the locations being considered" and the Service cannot "reasonably" use the data to suggest malathion is used less than the maximum allowable rate because it does not have "statistical descriptions of [malathion's] spatially and temporally distributed application rates." AR-186, 249.

Defendants' arguments to the contrary are unavailing because they do not engage with Plaintiffs' particular challenges. Defendants argue they need not acquire new data because the usage data, though weak, was the "best available science for predicting effects from malathion." (Dkt. No. 70 at 29.) But Plaintiffs do not argue the Service must acquire or create better data. (Dkt. No. 75 at 17-18.) Instead, Plaintiffs claim the Service "used incomplete and unreliable usage data in an impermissible way," (Dkt. No. 75 at 18), and Plaintiffs' opening brief argued the Service's approach was impermissible because the Service "knows the usage data is not of th[e] quality" recommended by the National Academy of Sciences. (Dkt. No. 58 at 22-23.) So, Plaintiffs have not disclaimed their "best available science" claim.

Defendants' briefing does not engage with the National Academy of Sciences' recommendations, except to say the Service made "conservative" "assumptions" that, in some cases, overestimate effects. (*See* Dkt. No. 70 at 27-31.) But these "assumptions" do not even attempt to explain *how* the data comports with the Academy's recommendations about data quality, intended use of data, spatiality, and temporality. *See Locke*, 776 F.3d at 995 ("An agency complies with the best available science standards so long as it does not *ignore* available studies, even if it disagrees with or discredits them.") (emphasis added); *Ctr. for Biological Diversity v. Regan*, 734 F. Supp. 3d 1, 46 (D.D.C. Apr. 12, 2024) *aff'd sub nom. Ctr. for Biological Diversity v. Zeldin*, 171 F.4th 356 (D.C. Cir. 2026) ("[T]he [Service] cannot simply ignore available biological information[. …] The information was available to the [Service], but the agency did not give it meaningful consideration.") (cleaned up); *cf. Bureau of Land Mgmt.*, 141 F.4th at 1013–14 (upholding an biological opinion's determination about what effects are "reasonably certain to occur" because the agency "supported [its] conclusion with studies"). Additionally, to the extent Defendants actually overestimated malathion's effects at times, that does not assuage these concerns because the opinion's "usage" analysis is not exclusively estimating a "reasonably certain" magnitude in a vacuum, *e.g.*, large vs. small impacts of malathion. Rather, the "usage" analysis is measuring *location*: it estimates *where* malathion is "reasonably certain" to overlap with a particular species' range. The Service needs to be "reasonably certain" about *location*, yet the Service is taking nationwide or statewide data it says cannot be understood at a statewide or

sub-state level, then comparing it to ranges mapped at the county or sub-county level. Therefore, Defendants' assumptions do not provide a "satisfactory explanation" for the agency's decision to consider usage data, *State Farm*, 463 U.S. at 43, nor does the data provide "clear and substantial information" about where malathion's overlap with a species range is "reasonably certain to occur." *Haaland*, 87 F.4th at 989. Rather, the Service's conclusions about *where* usage overlap will occur are merely "speculation sprinkled with dabs of evidence." *Id.*

Accordingly, the biological opinion's "usage" analysis is arbitrary, capricious, and not in accordance with the law and the Court grants Plaintiffs' motion with respect to their first claim.[14]

III. The Critical Habitat Determinations Are Arbitrary

As explained above, the Service determined malathion would not adversely modify or destroy any critical habitat. The Service made these determinations by (1) reviewing critical habitat rules to identify whether the habitat had pre-identified PBFs that may be affected by malathion, (2) identifying a preliminary concern level with a sequential, six-factor dichotomous key, then (3) considering species-specific information for species whose ranges overlap with malathion use sites and do not primarily occur on Federal lands. Additionally, in its review of critical habitat rules, the Service separated each habitat into three categories; all Category 2 habitats and some Category 1 habitats determinations received a three-word rationale "no relevant PBFs," with no further analysis regarding concern levels and species-specific information.

Plaintiffs argue the Service's critical habitat determinations are arbitrary for two reasons. First, the opinion relied on "arbitrary categories of critical habitat" as a "coarse filter" through which the Service "summarily determined" relevant PBFs were absent in all Category 2 and some Category 1 habitats "without a rational analysis of the life cycle and behavioral patterns of the species." (Dkt. No. 58 at 44) (cleaned up). Second, the Service addressed malathion's effects on

[14] As noted above, the Service relied on "usage" calculations to make many critical habitat determinations. But Plaintiffs' argument why the critical habitat determinations are arbitrary is not based on the usage data's limitations. Rather, Plaintiffs only raise the usage data limitations with respect to *jeopardy* findings. (*See* Dkt. No. 58 at 19 (identifying the "overlap component" of "effects of the action" as it pertains to "draft jeopardy opinions")). By contrast, the challenge to critical habitat determinations is about the usage calculations' "arbitrary 5% threshold" and its operation as a "coarse filter." (*See id.* at 44-48.) Accordingly, the Court's ruling does not mean all critical habitat determinations are arbitrary based on the known limitations of the usage data.

species' survival, but did not discuss "'the lost recovery value of critical habitat.'" (Dkt. No. 58 at 48 (quoting *Gifford*, 378 F.3d at 1074)). As explained below, the Court agrees on the first point, not the second.

However, the Court does not address Plaintiffs' argument about the "improper application of usage data to limit critical habitat analysis." (Dkt. No. 58 at 47) (cleaned up). Plaintiffs assert the usage data was evaluated through "an arbitrary 5% threshold" and operated as a filter to ignore other relevant information. (*Id.* at 47-48 (noting the usage data "fails to examine an important aspect of the problem," "limit[s …] discussion to boilerplate," and "avoids discussion"). The "usage" calculations underlying the critical habitat determinations are the same as the "jeopardy" determinations, which the Court finds are arbitrary. *See* AR-12501-02. Given the Service's determinations and calculations will likely be revisited on remand, the Court does not address whether the specific manner in which Defendants applied usage data in critical habitat determinations was arbitrary. That said, the Court addresses the Category 2 and Category 1 habitat determinations because the Service did not consider usage data when making those determinations.

A. The Determinations Based On "No Relevant PBFs" Rationales Are Arbitrary

Plaintiffs are correct: all Category 2 and some Category 1 habitat findings were "summarily determined" based on "arbitrary categories." (Dkt. No. 58 at 44.) The only written rationale for all Category 2 habitat determinations, and a subset of Category 1 habitat determinations, is just three words: "no relevant PBFs." *See generally* AR-30768-75, AR-31183-31120. The Service thoroughly explained the scientific literature behind malathion's toxicological effects on the four relevant PBFs, and why some taxonomic groups are more sensitive to malathion than others. *See* AR-12347-88. Plaintiffs do not broadly contest those conclusions; Plaintiffs challenge the summary nature of the "no relevant PBFs" determinations. The biological opinion explains the Service "reviewed each critical habitat rule to determine if" a relevant PBF was "explicitly identified or could be clearly and simply linked." AR-12498. Put another way, given each critical habitat designation is published in the Federal Register, the Service's explanation boils down to: it reviewed hundreds of final, published agency rules that widely vary

from one another, and its only guiding principle was whether a pre-identified category of features was made "explicit[]" "clear[]" or "simpl[e]." *See* AR-12498. The opinion does not explain what it means to "explicitly identif[y]" or "clearly and simply link[]" that pre-identified information, provide a template for how to apply that principle, or discuss particular habitat rules which failed to meet that principle. *Id.* The agency's explanation is akin to simply saying it read a regulation and determined it does not apply.

That is a textbook violation of the APA. As the opinion acknowledges, malathion "moves through the environment and interact[s] with other biotic and non-biotic stressors" in a "highly complex manner." AR-12470. With these complexities, and in the context of highly varying habitat rules and species' life histories, the words "explicit," "clear," and "simple" do not illustrate a "path" which can "reasonably be discerned" with respect to how the Service determined a habitat belonged to Category 1 or Category 2. *See State Farm*, 468 U.S. at 43 (cleaned up). The Service's uniform three-word rationale–"no relevant PBFs"–is a far cry from a "reasoned basis." *Id.* Elsewhere in the opinion, too, the Service provides a template worksheet for how to calculate "usage" in the jeopardy prong. AR-26807-18; *see Pac. Coast Fed'n of Fishermen's Associations v. U.S. Bureau of Reclamation*, 426 F.3d 1082, 1093–94 (9th Cir. 2005) (vacating a jeopardy analysis because one section of the biological opinion had "scant analysis" for its determination, and contrasting the section to more detailed sections of the opinion). With no similar template and no discussion of these Category 2 and Category 1 habitat designations, "[t]he agency essentially asks that we take its word" as to whether the designation has anything "relevant." *See id.* at 1092; *see also Forest Serv. Emples. v. USFS*, 726 F. Supp. 2d 1195, 1204–05, 1224–25 (D. Mont. 2010) (vacating critical habitat determinations in part because "[t]here are some species for which critical habitat is not even mentioned in the coarse filter spreadsheets. The discussion is not merely brief but nonexistent").

Defendants' briefing does not satisfactorily explain the "no relevant PBFs" rationales. Defendants state the "critical habitat analysis was properly structured around" PBFs and they "specifically analyzed … each designation or proposal," which does not illustrate *how* the Service reviewed a rule to determine it had "no relevant PBFs." (Dkt. No. 70 at 38-39.) Defendants then

highlight the critical habitat determination for the Niangua Darter. (*Id.* at 39-41.) The Niangua Darter is a fish species placed in Category 2, meaning malathion was unlikely to destroy or adversely modify its critical habitat because its habitat rule had "no relevant PBFs." AR-30722. To justify this rationale, Defendants cite the species' profile in Appendix C, which says:

> **Primary Constituent Elements/Physical or Biological Features**
>
> Constituent elements for all aras [sic] designated as critical habitat consist of:
>
> medium-sized creeks with silt-free pools and riffles and moderately clear water draining hilly areas underlain by chert and dolomite;
>
> water ranges from 8 to 46 inches in depth over gravel with scattered rubble.
>
> **Special Management Considerations or Protections**
>
> Stream channelization projects, often associated with road and bridge construction and maintenance, may result in erosion and siltation and affect the proposed critical habitat. Currently, there are no known or planned road or bridge projects within or in the vicinity of the proposed critical habitat. In addition, there is no known involvement of Federal funds or Permits for the activities occurring on private land within the proposed critical habitat area.

(Dkt. No. 70 at 40 (citing AR-15941)); *see also* 50 FR 24649-02, 1985 WL 102355 (final critical habitat designation for the Darter repeating the description under Appendix C's "Physical and Biological Features" heading). Based on this short excerpt, Defendants argue they "reasonably concluded these PBFs were unlikely to be affected by malathion" because the excerpt says "'erosion and siltation' may affect the critical habitat." (Dkt. No. 70 at 40 (quoting AR-15941)). "While these PBFs indeed relate to water," Defendants assert the focus with respect to the water quality PBF was on "contamination" and "malathion contamination would not affect water clarity or contribute to erosion or siltation." (Dkt. No. 70 at 40 (citing AR-12494)).

Defendants' explanation is inadequate in two respects. First and dispositively, it is a post-hoc rationalization. At no point in Appendix C or Appendix L does the agency say it determined "medium-sized creeks with silt-free pools" and "moderately clear water" contain "no relevant PBFs," such as water quality and habitat function. AR-12494, 15941. That determination requires at least some analysis of the habitat rule, and the only written discussion for the Darter's

habitat rule is "no relevant PBFs." *See id.* Second, Defendants' briefing plainly contradicts the Service's categorization process. Defendants admit the PBFs described in the habitat rule–"medium-sized creeks" and "moderately clear water"–"indeed relate to water." (Dkt. No. 70 at 40 (quoting AR-15941)). That much is obvious. But according to the biological opinion, the Darter's Category 2 placement meant "water quality" and "habitat function" was not "explicitly identified" or "clearly and simply linked" in the Darter's habitat rule. *See* AR-12498. In other words, to justify a "no relevant PBF" Category 2 rationale for the Darter fish, Defendants needed to explain why "medium-sized creeks" and "moderately clear water" does not "explicitly identif[y]" or "clearly and simply link[]" to water quality and habitat function. *See id.*; AR-12494.

Defendants did not do so. Instead, Defendants assert they "reasonably concluded" "malathion contamination would not affect water clarity or contribute to erosion or siltation." (Dkt. No. 70 at 40.) At no point does the biological opinion ever state that conclusion. *See generally* AR-12274-12612 (referencing "erosion" 12 times and "silt" once, never in connection with malathion). Nor does the opinion do so with respect to the Niangua Darter, or any habitat that received a "no relevant PBFs" rationale.[15] Again, "[t]he agency essentially asks that we take its word" on whether there "no relevant PBFs." *See Fishermen's Associations*, 426 F.3d at 1093–94. There is no basis in the record for the Court to do so.

So, the Court grants Plaintiffs' motion as to the critical habitat determinations that received a "no relevant PBFs" rationale.

B. Critical Habitat Determinations Need Not Separately Address Recovery

Plaintiffs briefly assert "the ESA and its regulations require FWS to analyze the impacts of

[15] Defendants also highlight the critical habitat determination for the Great Lakes Piping Plover. (Dkt. No. 70 at 41.) The Great Lakes Piping Plover received a "no relevant PBFs" rationale because its critical habitat is in Category 2. AR-30769. Defendants acknowledge the Service "incorrectly copied" the wrong critical habitat information into the species' profile in Appendix C. (*Id.* at 41 n.14.) In support of every critical habitat determination, the opinion points the reader to "[m]ore details about the critical habitat designations and any associated PBFs … in … Appendix C." AR-30768. Those "details" about the Great Lakes Piping Plover, by Defendants' own admission, are "incorrect[.]" (Dkt. No. 70 at 41 n.14.) Defendants assert the error is "inconsequential" because the Service's "analysis" of the species' habitat was nonetheless based on "the correct PBFs." (*Id.*) Again, Defendants are asking the Court to take their word. This so-called "analysis" of the "correct PBFs" consists of three words in Appendix L, and Defendants offer no authority for the argument the error is "inconsequential."

the action on a species ability to recover, not just survive … in the 'adverse modification' analysis for critical habitat." (Dkt. No. 58 at 48.) Not so.

Plaintiffs rely on two cases: *Gifford*, 378 F.3d 1059 and *National Wildlife Federation v. NMFS*, 524 F.3d 917 (9th Cir. 2007). Neither case suggests a biological opinion must, under operative regulations, separately discuss survival and recovery in the context of critical habitat. *Gifford* interpreted an ESA regulation defining "destruction or adverse modification" as "a direct or indirect alteration that appreciably diminishes the value of critical habitat for **both the survival and recovery** of a listed species." 378 F.3d at 1069 (cleaned up) (emphasis added). There, the phrase "survival and recovery" meant a biological opinion's "singular focus" on survival violated the ESA. *Id.* at 1070. *National Wildlife*, too, applied *Gifford*'s reasoning to the regulatory definition of "jeopardy," which said "survival and recovery." *See* 524 F.3d at 930–32. At the time the biological opinion here was issued, however, the operative definition of "destruction or adverse modification" did not say "both survival and recovery." Rather, the biological opinion cited the definition "a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species." AR-30765.[16]

After the removal of the phrase "survival and recovery," the Ninth Circuit has interpreted the definition of "destruction or adverse modification" more narrowly than in *Gifford*:

> We agree with Defendants that the plain language of the ESA requires that an adverse modification of critical habitat consists of two elements: (1) a "modification" of the habitat that is (2) "adverse." 16 U.S.C. § 1536(a)(2). Both the 1986 and 2016 definitions reflect that understanding by defining adverse modification as a "direct or indirect alteration" that "appreciably diminishes the value of the critical habitat." 50 C.F.R. § 402.02 (2014) (emphasis added); 50 C.F.R. § 402.02 (2016) (same).

Zinke, 856 F.3d at 1261. There, the Ninth Circuit upheld a biological opinion, rejecting an argument that a certain impact on a species–reduced connectivity between tortoise populations–

[16] The regulations in effect at the time of the biological opinion have been vacated. In March 2026, *Ctr. for Biological Diversity v. U.S. Dep't. of Interior, et al.*, 2026 WL 898264 (N.D. Cal. Mar. 20, 2026) vacated the 2019 revisions to the definitions of "destruction or adverse modification" and reinstated the versions in effect before then. This decision does not change the analysis here because as of 2016, the regulations did not have the phrase "both survival and recovery." *See Defs. of Wildlife v. Zinke*, 856 F.3d 1248, 1260 (9th Cir. 2017).

must be considered an "adverse modification" because it impacts the species' recovery. *Id.* at 1260–63. Given Plaintiffs do not address *Zinke* and its narrower interpretation of "destruction or adverse modification," the Court is unpersuaded the operative federal regulations require a separate recovery analysis in the context of critical habitat.

Accordingly, Defendants and Intervenor-Defendant are entitled to summary judgment on Plaintiffs' claim the biological opinion failed to address recovery.

IV. Remedy

Plaintiffs request an order declaring the biological opinion unlawful, "vacating the portions of the Incidental Take Statement regarding the 1534 species that did not receive species-specific conservation measures," and remanding the remainder of the opinion. (Dkt. No. 58 at 2; *see also* Dkt. No. 58-2.) Plaintiffs characterize their request as "partial vacatur" (Dkt. No. 75 at 32) and "take less issue with the 'no jeopardy' determinations for 64 species that received species-specific conservation measures" because those measures offer at least some protection for species. (*See* Dkt. No. 58 at 33.) So, Plaintiffs assert their request is tailored to "reduce the risk to species where [the Service] is allowing more incidental take than if it had conducted a proper analysis to arrive at its no-jeopardy determinations." (Dkt. No. 75 at 32.) Plaintiffs also request the Order require Defendants to issue a new biological opinion "within nin[e] months," grant Plaintiffs permission to "move for interim mitigation measures" to protect species and habitats "until Defendants complete a new biological opinion," and state the Court "shall maintain jurisdiction over this action" until Defendants comply with the ESA, APA, and other court orders. (Dkt. No. 58-2 at 1-2.)

Defendants, however, assert it is premature to consider remedy and request separate remedy briefing. (Dkt. No. 70 at 48.) In denying Plaintiffs' motion to admit extra-record evidence, the Court noted "[i]f the Court determines it is appropriate to set aside the biological opinion as arbitrary or capricious, it will proceed to consideration of the proper remedy, and at that time, Plaintiffs may move to admit" extra-record evidence." (Dkt. No. 69 at 8.)

Accordingly, the Court declares the U.S. Fish and Wildlife Service's 2022 Malathion Biological Opinion unlawful because it is arbitrary and capricious under the Administrative

Procedure Act and not in accordance with the Endangered Species Act. With respect to Plaintiffs' remaining requests, the Court orders the parties to meet and confer regarding a remedy that is consistent with this Order and the APA. The parties shall file a joint statement regarding remedy by June 5, 2026. If the parties agree to a proper remedy, then separate remedy briefing is unnecessary.

CONCLUSION

As explained above, the Court grants in part and denies in part the parties' cross-motions. Plaintiffs have demonstrated Article III standing to challenge the jeopardy analysis' "usage" factor, the critical habitat analysis' categorization scheme, and the failure to separately consider recovery in the context of critical habitat. Plaintiffs are entitled to summary judgment with respect to two claims: the jeopardy determinations are arbitrary because they rely on arbitrary species' range estimates and pesticide usage data, and the Category 2 and some Category 1 critical habitat determinations are arbitrary because they rely on an arbitrary categorization scheme. Defendants and Intervenor-Defendant are entitled to summary judgment with respect to Plaintiffs' claim the critical habitat determinations are arbitrary because they fail to separately address recovery.

Accordingly, the Court declares the U.S. Fish and Wildlife Service's 2022 Malathion Biological Opinion unlawful because it is arbitrary and capricious under the Administrative Procedure Act and not in accordance with the Endangered Species Act. The Court will decide other remedies at a later stage.

This Order disposes of Docket Nos. 58, 70, and 73.

IT IS SO ORDERED

Dated: May 13, 2026

Jacqueline Scott Corley

JACQUELINE SCOTT CORLEY
United States District Judge

United States District Court
Northern District of California