DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2024–0161; FXES1111090FEDR–256–FF09E21000]

RIN 1018–BH84

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Clear Lake Hitch

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Clear Lake hitch (*Lavinia exilicauda chi*), a freshwater fish subspecies in the North American minnow family that is restricted to the Clear Lake watershed in Lake County, California, as a threatened species under the Endangered Species Act of 1973, as amended (Act). This determination also serves as our 12-month finding on a petition to list the Clear Lake hitch. After a review of the best available scientific and commercial information, we find that listing the Clear Lake hitch is warranted. Accordingly, we propose to list the Clear Lake hitch as a threatened species with protective regulations issued under section 4(d) of the Act (''4(d) rule''). If we finalize this rule as proposed, it would add the Clear Lake hitch to the List of Endangered and Threatened Wildlife and extend the Act's protections to this subspecies.

DATES: We will accept comments received or postmarked on or before March 17, 2025. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. eastern time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by March 3, 2025.

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *https://www.regulations.gov.* In the Search box, enter FWS–R8–ES–2024–0161, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on ''Comment.''

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R8–ES–2024–0161, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *https://www.regulations.gov.* This generally means that we will post any personal information you provide us (see Information Requested, below, for more information).

Availability of supporting materials: Supporting materials, such as the species status assessment report, are available at *https://www.regulations.gov* at Docket No. FWS–R8–ES–2024–0161.

FOR FURTHER INFORMATION CONTACT: Michael Fris, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Sacramento, CA 95825; telephone 916–414–6700. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States. Please see Docket No. FWS–R8–ES–2024–0161 on *https://www.regulations.gov* for a document that summarizes this proposed rule.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range).

If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that the Clear Lake hitch meets the Act's definition of a threatened species; therefore, we are proposing to list it as such. Listing a species as an endangered or threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. We propose to list the Clear Lake hitch as a threatened species with a rule issued under section 4(d) of the Act.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the Clear Lake hitch meets the definition of a threatened species due to the following threats: habitat loss, degradation, and modifications (Factor A), predation (Factor C), competition (Factor E), and the effects of climate change (Factor E).

Section 4(a)(3) of the Act requires that the Secretary of the Interior (Secretary), to the maximum extent prudent and determinable, concurrently with listing designate critical habitat for the species. Section 3(5)(A) of the Act defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed, 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 protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species. Section 4(b)(2) of the Act states that the Secretary must make the designation on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts of specifying any particular area as critical habitat. At this time, critical habitat for the Clear Lake hitch is not determinable.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

(1) The Clear Lake hitch's biology, range, and population trends, including:

(a) Biological or ecological requirements of the subspecies,

including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns and the locations of any additional areas occupied by the subspecies;

(d) Historical and current population levels, and current and projected trends; and

Past and ongoing conservation measures for the subspecies, its habitat, or both.

(2) Threats and conservation actions affecting the subspecies, including:

(a) Factors that may be affecting the continued existence of the subspecies, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors;

(b) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this subspecies; and

(c) Existing regulations or conservation actions that may be addressing threats to this subspecies.

(3) Additional information concerning the historical and current status of this subspecies.

(4) Information to assist with applying or issuing protective regulations under section 4(d) of the Act that may be necessary and advisable to provide for the conservation of the Clear Lake hitch. In particular, we seek information concerning:

(a) The extent to which we should include any of the section 9 prohibitions in the 4(d) rule; or

(b) Whether we should consider any additional exceptions from the prohibitions in the 4(d) rule.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, do not provide substantial information necessary to support a determination. Section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened species must be made solely on the basis of the best scientific and commercial data available.

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *https://www.regulations.gov,* your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *https://www.regulations.gov.*

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *https://www.regulations.gov.* Our final determination may differ from this proposal because we will consider all comments we receive during the comment period as well as any information that may become available after this proposal. Based on the new information we receive (and, if relevant, any comments on that new information), we may conclude that the Clear Lake hitch is endangered instead of threatened, or we may conclude that the subspecies does not warrant listing as either an endangered species or a threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new information received. For example, we may expand the prohibitions if we conclude that the protective regulation as a whole, including those additional prohibitions, is necessary and advisable to provide for the conservation of this subspecies. Conversely, we may establish additional exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the subspecies. In our final rule, we will clearly explain our rationale and the basis for our final decision, including why we made changes, if any, that differ from this proposal.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing. We may hold the public hearing in person or virtually via webinar. We will announce any public hearing on our website, in addition to the **Federal Register**. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

On September 25, 2012, we received a petition from the Center for Biological Diversity to list the Clear Lake hitch as an endangered or threatened species under the Act and to designate critical habitat. The Service issued a 90-day finding on April 10, 2015 (80 FR 19259), stating that the petition presented substantial information that listing the Clear Lake hitch may be warranted and initiating a status review of the subspecies. On December 3, 2020, we published our 12-month finding that the Clear Lake hitch was not warranted for listing under the Act (85 FR 78029).

The Center for Biological Diversity filed a complaint in the Northern District of California on August 17, 2021, challenging our 12-month not-warranted finding. By stipulated settlement agreement approved by the court on April 14, 2022, the Service agreed to submit to the **Federal Register** a new 12-month finding for the Clear Lake hitch on or before January 12, 2025 (*Center for Biological Diversity* v. *U.S. Fish and Wildlife Service, et al.,* No. 3:21–cv–06323–RS (N.D. Cal.)).

Peer Review

In 2020, a species status assessment (SSA) team prepared an SSA report (version 1.0; Service 2021, entire) for the Clear Lake hitch's 12-month finding (85 FR 78029; December 3, 2020). The SSA team was composed of Service biologists, in consultation with other species experts. In 2024, the SSA report was updated with new information (*e.g.,* survey data, life history information, conservation actions) (version 2.0; Service 2024, entire). The SSA report (version 2.0; Service 2024, entire) represents a compilation of the best scientific and commercial data available concerning the status of the subspecies, including the impacts of past, present, and future factors (both negative and beneficial) affecting the subspecies. species.

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review in listing and recovery actions under the Act (*https://www.fws.gov/sites/default/files/documents/peer-review-policy-directors-memo-2016-08-22.pdf*), we solicited independent

scientific review of the information contained in the Clear Lake hitch SSA report (version 2.0; Service 2024, entire). We sent the SSA report to three independent peer reviewers and we received responses from two reviewers. Results of this structured peer review process can be found at *https://www.regulations.gov.* In preparing this proposed rule, we incorporated the results of these reviews, as appropriate, into the SSA report, which is the foundation for this proposed rule.

Summary of Peer Reviewer Comments

As discussed above in Peer Review, we received comments from two peer reviewers on the draft SSA report, version 2.0. We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the information contained in the SSA report. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions, including edits to improve the overall report. Otherwise, no substantive changes to our analysis and conclusions within the SSA report were deemed necessary, and peer reviewer comments are incorporated in version 2.1 of the SSA report (Service 2024, entire).

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Clear Lake hitch is presented in the SSA report (version 2.1; Service 2024, pp. 16–36) and in the previous 12-month finding (85 FR 78029; December 3, 2020). The Clear Lake hitch is a medium-sized freshwater fish subspecies classified in the *Lavinia* genus in the Leuciscidae family (Service 2024, p. 16). The subspecies is endemic to the Clear Lake watershed in the northern section of the California Coast Ranges.

Historically, Clear Lake hitch occurred in numerous lakes and ponds found throughout the Clear Lake watershed, including Clear Lake, Thurston Lake, Upper Blue Lake, Lower Blue Lake, and Lampson Pond. During the spring, the Clear Lake hitch could also be found spawning in the numerous tributaries to these larger waterbodies, including Kelsey, Scott, Middle, Adobe, Seigler Canyon, Manning, Cole, Morrison, and Schindler creeks (figure 1). The subspecies still occurs in Clear and Thurston Lakes throughout the year until the spring, when reproductive adults migrate into tributaries to spawn. Annual surveys conducted in Clear Lake have shown that there are fluctuations in the estimated abundances from year to year. The Clear Lake hitch was thought to be extirpated from the Blue Lakes, but observations and fish rescue efforts in 2022 show evidence of hitch in both Upper Blue Lake and Lower Blue Lake (Ewing 2022a, entire; Santana 2022, entire). It is unclear whether Lampson Pond still exists (B. Ewing *in litt.* 2020); therefore, the status of the Clear Lake hitch in Lampson Pond is unknown. All of the described waterbodies besides Thurston Lake were hydrologically connected in the past, and it appears that Thurston Lake and its tributary, Thurston Creek, have always been isolated from the other waterways (B. Ewing *in litt.* 2020; P. Windrem *in litt.* 2020).

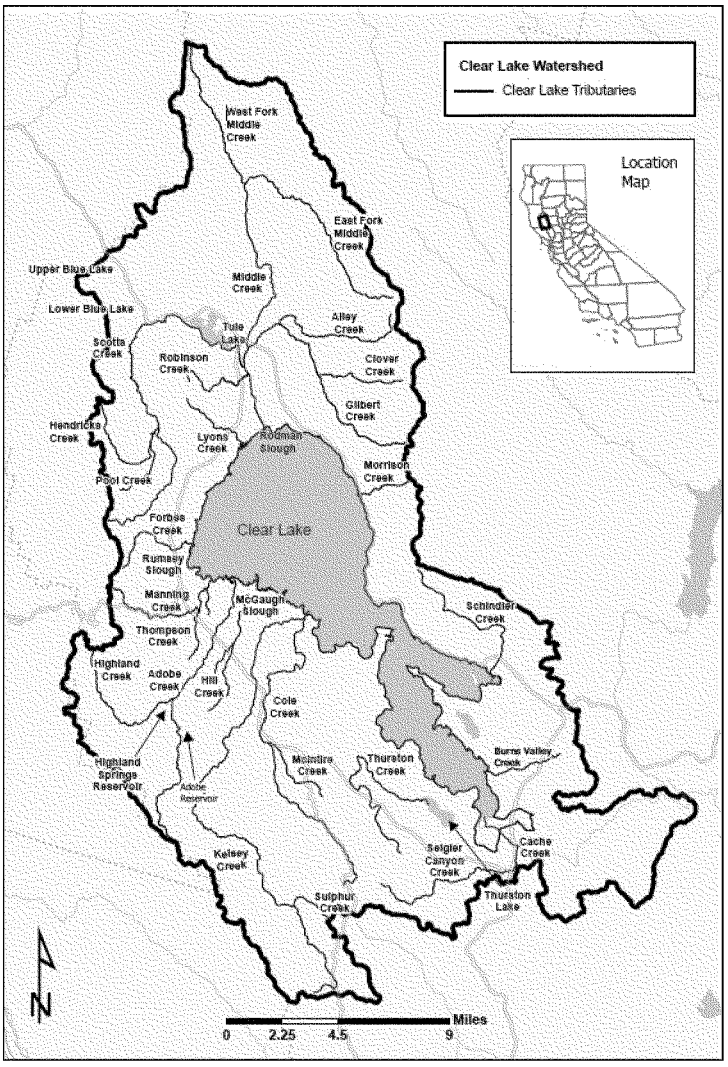

Figure 1. Clear Lake Hitch range map with tributaries and lakes.

Within the lacustrine habitats, the subspecies can be found in either the littoral zone (nearshore) as juveniles or the limnetic zone (sun-lit, offshore open water) as adults. During extreme drought conditions, the only successful reproduction may be within the lakes. Nonnative vegetative growth along the lake's shoreline can outcompete the growth of important native wetland plant species, such as tule. Nonnative plant species, such as Himalayan blackberry (*Rubus armeniacus*), growing along the tributaries can become so overgrown that they become passage barriers or they outcompete native species such as willows and cottonwoods.

Clear Lake hitch begin to migrate into spawning tributaries when there is sufficient runoff, typically between February and May, and sometimes into June if flows are sufficient (Macedo 1994, p. 2; California Department of Fish and Wildlife (CDFW) 2014, p. 1). Eggs are deposited on fine to medium-sized gravel that is along the margin or mid-channel of the stream (Shapovalov 1940 as cited in Murphy 1948b, p. 102; Kimsey 1960, p. 211; CDFW 2014, p. 8), where they hatch into larval fish called fry. Fry stay in the streams anywhere between 11 to 152 days, migrating to the lake once stream waters diminish (Murphy 1948b, pp. 105, 106, 109; Swift 1965, pp. 75, 77–79; Moyle et al. 1995, p. 154; Feyrer et al. 2019a, p. 1693). Juvenile hitch less than 2 inches (in., 50 millimeters (mm)) standard length (SL, length of a fish measured from the tip of their mouth/snout to the end of the tail, excluding the caudal (tail) fin) are found within the nearshore habitat of the lake, where they utilize stands of tule (*Schoenoplectus acutus*) and other submerged aquatic vegetation for cover and feed on various diet items, including insects such as the Clear Lake gnat (*Chaoborus astictopus*), *Daphnia* and other planktonic crustaceans, and chironomid midges.

The Clear Lake hitch females are known to grow larger than males (Geary 1978, pp. 7, 9), and larger females produce more eggs (average annual fecundity is 36,000 eggs, with a range of 9,000–63,000) (Geary and Moyle 1980, p. 387). Males are sexually mature within their first or second year, whereas females are sexually mature in their second or third year (Murphy 1948b, pp. 103–104, 109; Moyle et al. 1995, p. 153). Hitch are thought to live 4 to 6 years based on scale analysis, but it is possible some individuals can live longer (Moyle 2002, p. 138; CDFW 2014, p. 8).

There is uncertainty around where current reproduction and recruitment

are successfully occurring, and whether other small waterbodies upstream of Clear Lake are supporting the Clear Lake population. In 2017 and 2018, 280 and 297 hitch were captured, respectively. The Clear Lake hitch was the fifth most abundant species/subspecies collected over the course of the 2017 survey and the most abundant species/subspecies captured during the 2018 effort (USGS 2018, p. 8). However, the number of hitch captured during the 2019, 2021, and 2022 surveys drastically declined to only 76, 40, and 6 individuals, respectively. In 2023, the number of individuals captured increased to 304 individuals and included multiple stage classes (Clear Lake Hitch Summit Agenda and Presentations 2023, p. 84; Palm et al. 2023, entire). There is a working hypothesis that the increase in the number of hitch seen in 2023 is due to hitch presence in smaller lakes in the watershed (*e.g.,* Blue Lakes, Tule Lake). The theory is that small populations of the Clear Lake hitch are successfully reproducing in these other waterbodies, and during a wet year, like the historically wet year in 2023, individuals were washed from these smaller lakes into Clear Lake.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species.

The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term ''threat'' to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term ''threat'' includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term ''threat'' may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an ''endangered species'' or a ''threatened species.'' In determining whether a species meets either definition, we must evaluate all identified threats by considering the species' expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior, Office of the Solicitor (M–37021, January 16, 2009; ''M-Opinion,'' available online at *https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf*). The foreseeable future extends as far into the future as the U.S. Fish and Wildlife Service and National Marine Fisheries Service (hereafter, the Services) can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. We need not identify the foreseeable future in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best available data and consider the species' life-history characteristics, threat-projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make reasonably reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be proposed for listing as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess the Clear Lake hitch's viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events); and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the Clear Lake hitch's ecological requirements for survival and reproduction at the individual, population, and subspecies levels, and described the beneficial and risk factors influencing the subspecies' viability.

The SSA process can be categorized into three sequential stages. During the

first stage, we evaluated the individual Clear Lake hitch's life-history needs. The next stage involved an assessment of the historical and current condition of the subspecies' demographics and habitat characteristics, including an explanation of how the subspecies arrived at its current condition. The final stage of the SSA involved making predictions about the subspecies' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of the Clear Lake hitch to sustain populations in the wild over time, which we then used to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–R8–ES–2024–0161 on *https://www.regulations.gov.*

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the Clear Lake hitch and its resources, and the threats that influence the subspecies' current and future condition, in order to assess the subspecies' overall viability and the risks to that viability.

Additional information regarding the subspecies' needs can be found in the SSA report (Service 2024, pp. 24–36).

Subspecies Needs

The Clear Lake hitch has four life stages: egg/embryo, larvae/fry, juveniles, and adults. Below, we assess the best available information to identify the specific habitat components needed to support individual fitness at all four life stages for the Clear Lake hitch. Each life stage requires different environmental and habitat components according to the different habitats used throughout the species' lifetime for spawning, feeding, and sheltering. Once fertilized, Clear Lake hitch eggs require adequate stream flow to stay submerged and oxygenated; fine to medium-sized, clean gravel along the margin or within the mid-channel of the stream to hold position during development; and presumably temperatures between 55.4 and 64.4 degrees Fahrenheit (°F) (13 and 18 degrees Celsius (°C)) for successful development (Shapovalov 1940 in Murphy 1948b, p. 102; Kimsey 1960, p. 211; Swift 1965, pp. 75, 77; Moyle et al. 1995, p. 154; Moyle 2002, p. 138; CDFW 2014, p. 8; Feyrer 2019a, p. 227). To initiate hatching, water temperatures must be maintained at 59 to 71.6 °F (15 to 22 °C) for multiple days (Swift 1965, pp. 75, 77; Moyle 2002, p. 138).

Newly hatched larvae/fry have a small yolk sac that they require for nourishment until they are able to swim freely and capture aquatic invertebrate prey (Kimsey 1960, p. 212). For cover and temperature regulation, downstream migrating fry likely require instream and/or overhanging streamside vegetation. The fry life stage requires adequate stream flow to stay alive, and adequate flow needs to be maintained until the young of year are able to migrate downstream into the lake (Murphy 1948b, pp. 105, 106, 109; Swift 1965, pp. 75, 77–79; Moyle et al. 1995, p. 154; Feyrer et al. 2019a, p. 1693).

Within the lake, Clear Lake hitch fry and juveniles require stands of tule and/or other submerged aquatic vegetation to act as cover from predators and to provide for invertebrate prey items, including insects, planktonic crustaceans, and chironomid midges. Juveniles also require the lake water to be of sufficient quality (*i.e.,* well-oxygenated (more than 2 milligrams per liter (mg/L) of oxygen) and minimally contaminated) and for water temperatures to be 59 °F (15 °C) or greater for survival (Franson 2012, p. 15; CDFW 2014, p. 9). Juvenile hitch transition to adulthood when they reach about 2 in (50 mm) and they move from the lake's nearshore habitat out into the open water of the lake.

Adult Clear Lake hitch require a diet almost exclusively composed of *Daphnia,* but also other zooplankton species and adult midges and insects (Lindquist et al. 1943, p. 199; Geary 1978, pp. 17, 25; Geary and Moyle 1980, p. 388; Moyle et al. 1995, p. 153; Moyle 2002, pp. 137–138; Moyle et al. 2014, p. 3). Adult Clear Lake hitch also require well-oxygenated (more than 2 mg/L of oxygen) and minimally contaminated water within the lake to ensure survival (Franson 2012, p. 15; CDFW 2014, p. 9). Adult Clear Lake hitch are only found in the tributaries during the spawning season. A reproductive adult that is attempting to spawn requires an adequate amount of flow to migrate upstream to appropriate spawning locations and downstream back to the lake, and water temperatures between 55.4 and 64.4 °F (13 and 18 °C) to trigger spawning activity (Swift 1965, pp. 75, 77; Moyle 2002, p. 138; Feyrer 2019a, p. 227).

In addition to stream spawning, some reproductive adults spawn within the lake (or ponds) instead of migrating into the lake tributaries. Lake or pond spawning Clear Lake hitch have been documented spawning in areas with only a mud substrate that contains no gravel, so it is possible lake- or pond-spawning individuals do not require gravel to successfully spawn (Kimsey 1960, p. 214; Geary 1978, p. 22).

Threats

In assessing the Clear Lake hitch's viability, we describe the threats acting on the subspecies and its habitat. We also provide a description of historical and ongoing activities or regulations that ameliorate the threats and provide conservation benefits to the subspecies. The threats acting on the Clear Lake hitch include habitat loss, degradation, and modification; predation; competition; mercury mining; and the effects of climate change. Due to the different aquatic habitats (lake and tributary) used by the subspecies, there are threats acting on different life stages of the subspecies. These threats along with other ongoing and future stressors acting on the species may act synergistically to cause declines in resiliency across populations and analysis units. An example includes the effects of climate change with increased temperatures and aridity, may lead to more fires in the area. Burned areas create more runoff into the lake and tributary systems, further degrading habitat and affecting all life stages of the Clear Lake hitch. We note here that Thurston Lake does not have the level of threats acting on the subspecies that are affecting the hitch in Clear Lake.

Habitat Loss, Degradation, and Modification

Habitat loss, degradation, and modification are affecting the subspecies in both the tributary and lake systems. Changes to the Clear Lake watershed have occurred since the mid-1800s. Various forms of past mining activities, agricultural and urban development, pesticide use, increased fire activity, past deforestation, and historical grazing practices have all contributed to the degradation of the Clear Lake watershed and are also the cause of toxic cyanobacteria blooms and periodic fish kills in the lake. The degradation of tributaries has changed their hydrology, reducing the amount of water retained in the streams over the Clear Lake hitch's spawning season. This loss of flow earlier in the season and the presence of numerous passage barriers in the tributaries have greatly reduced reproduction and early life stage survival (egg, larvae) of the Clear Lake hitch. The conversion of wetland habitats surrounding Clear Lake not only negatively impacted the lake's water quality but also reduced the amount of rearing habitat for any juvenile hitch that are able to migrate to the lake from their natal stream. This loss of rearing habitat also reduces early

life stage survival (juvenile), further reducing the likelihood of recruitment. The impacts to Clear Lake's water quality affect adult hitch survival, especially when poor lake conditions result in large fish kills.

The Clear Lake hitch relies on tributary habitat for spawning and early rearing (Murphy 1951, p. 480). It is estimated that, historically, the tributaries to Clear Lake ran until at least September; currently, however, besides a few tributaries, most are known to dry by early summer or late spring (Murphy 1951, p. 480; B. Ewing *in litt.* 2020; Ewing 2020, pp. 3–5; Ewing 2021, pp. 6–7; Ewing 2022b, p. 7; B. Ewing *in litt.* 2024). A combination of activities contributed, and are continuing to contribute, to the reduction in tributary flow during the Clear Lake hitch's spawning season. Increased fire activity and legacy effects from instream gravel removal and deforestation have likely increased the rate of runoff within the tributaries during the winter. For example, burned vegetation removes the root systems that hold soil in place and, with subsequent rainfall, increases runoff and sedimentation into the subspecies' habitat. Those same factors, possibly in conjunction with both in-creek and groundwater pumping for urban and agricultural uses, have greatly reduced the amount of flow that actually makes it to the lake during the summer (Murphy 1951, p. 480).

Gravel mining activities in the Clear Lake watershed first began in the latter half of the 19th century and occurred in most of the spawning tributaries to Clear Lake (Suchanek et al. 2003, pp. 1253–1254; Thompson et al. 2013, p. 19). Gravel mining originally occurred as scattered operations throughout the watershed until the early- to mid-20th century, when operations became centralized within the creeks (County of Lake 1992, p. 48; Richerson et al. 1994, p. III–19). This time period coincides with improved automobile technology and increased pressure to build more reliable roads (County of Lake 1992, p. 48). As the human population within the county grew in the 1960s and 70s, new houses and associated roads needed to be constructed to accommodate the new residents. Since the instream gravel was available as a convenient source of material, gravel was extracted from the tributaries and was used as building material for both homes and roads (County of Lake 1992, p. 48; Richerson et al. 1994, p. VIII–150). Until the 1981 partial moratorium on instream gravel extraction, approximately 1 million metric tons of instream gravel was extracted from the watershed (Richerson et al. 1994, pp. III–19–III–20; CDFW 2014, p. 29). Although the amount of gravel mining within the Clear Lake tributaries has been reduced, mining and extraction are still known to occur in areas where the Clear Lake hitch occur, such as Scotts and Alley creeks (Murphy 1948b, p. 106; Richerson et al. 2008, p. A260; CDFW 2014, p. 29; B. Ewing *in litt.* 2020).

Past gravel mining in tributaries not only removed spawning substrate that the subspecies uses for reproduction and egg development, but it also lowered streambeds and destabilized channels, causing increased erosion, incision, and channelization. In addition, large swaths of riparian vegetation were removed from along the tributaries to allow access for gravel extraction, further exacerbating the issues with erosion. The flushing of eroded material not only negatively impacted tributaries by increasing the amount of suspended sediments and silt within the creek, ultimately increasing turbidity in some tributaries to zero visibility, but it also negatively impacted the lake ecosystem when those sediments eventually were transported into the lake (CDFG 1955, entire; Richerson et al. 1994, pp. III–19, VIII–2; Service 2024, pp. 44–48; Suchanek et al. 2003, p. 1254; CDFW 2014, pp. 29, 45).

In addition to gravel mining, agricultural practices have impacted, and still are impacting, the Clear Lake hitch's habitat. Agricultural production in the Clear Lake area has been important since the mid-1800s with crops that included apples, almonds, grapes, nectarines, peaches, pears, plums, and prunes, many of which are still grown today (Suchanek et al. 2003, p. 1256; U.S. Department of Agriculture (USDA) 2023, entire). Much of the land surrounding Clear Lake has been converted from forest lands to agricultural use. Large-scale deforestation and land conversion within the watershed began in the mid-19th century. The large-scale forest removal within the Clear Lake watershed increased the amount of erosion occurring in the tributaries, contributing to bank incision within the tributaries and causing increased sediment and nutrient transport into the lake (Suchanek et al. 2003, pp. 1247–1248). Increased erosion and bank cutting decrease the amount of time that water is retained within the tributaries, which affects water quantity and flow needed by the subspecies.

Agricultural development is found throughout the watershed; however, it is most concentrated in the southwestern area of the watershed, primarily near Kelsey and Adobe creeks (USDA 2023, entire). The presence of agricultural production in the watershed not only has an impact on the amount of water flowing in the tributaries to Clear Lake, but it likely also increases the amounts of contaminants, in the form of pesticides and fertilizers, and sediment entering the lake.

Pesticides are used for agriculture production across the region. Pesticides not only affect the habitat but may also affect certain life stages of the Clear Lake hitch and affect the subspecies' prey species. The reported application of pesticides on agricultural lands in the region has increased from 2008 to 2021. In 2008, more than 589,500 pounds of different forms of chemicals used as pesticides were applied in Lake County (California Pesticide Information Portal (CALPIP) 2019, unpaginated). In 2021, that amount increased to almost 741,000 pounds (CALPIP 2021, unpaginated). Pesticides are also known to be used for illegal cannabis crops, and it is possible that pesticides associated with illegal grows could drain into the Clear Lake watershed, further exacerbating declining water quality conditions. The primary concerns of pesticide effects on Clear Lake hitch are the high toxicity. Growers can add these chemicals to their irrigation systems, causing the chemicals to seep into the surrounding soil and waterways (California Department of Pesticide Regulation 2021, p. 2; USDA 2023, entire). Pesticides are known to cause fish casualties, growth delays, and swimming abnormalities, making fish more susceptible to predation (Baker 2018, pp. 2–3).

Fertilizers that get into waterways can cause nutrient imbalances that affect oxygen levels in the water, causing cyanobacteria blooms and fish kills (Baker 2018, p. 6). Another concern is water diversions associated with these illegal cultivation sites, which can block fish passage, change flow regimes, and cause other secondary effects (Baker 2018, p. 6). However, it is unknown what effect agricultural pesticides or pesticides associated with illegal grows are having on the aquatic environment in Clear Lake or if pesticides are being transported through tributaries into the lake (Suchanek et al. 2003, p. 1252).

Herbicides Are Used To Control Nonnative Aquatic Vegetation in Clear Lake

Komeen™ (copper sulfate) and SONAR™ (fluridone) have been applied in the lake to control *Hydrilla verticillata,* a highly invasive, submerged aquatic weed (Suchanek et

al. 2003, p. 1250; CDFW 2014, p. 32). Two herbicides were used to target different parts of the plant; Komeen targets *Hydrilla* vegetative growth, while SONAR treats the tubers (Suchanek et al. 2003, p. 1250). SONAR is considered less toxic than Komeen because SONAR is a systemic herbicide that is slowly absorbed in the vascular system; SONAR also impacts similar non-target vegetation such as tule and other submerged vegetation (Bairrington 2000, pp. 64–65; CDFW 2014, p. 32). Because juvenile Clear Lake hitch require tule habitat for cover and prey, the use of Komeen can indirectly impact the hitch by reducing the amount of rearing habitat (CDFW 2014, p. 32). The use of the herbicide, SONAR, at high concentrations may have an impact on early hitch development.

To meet the needs for agricultural production, crops require sufficient water. Water extraction and the early drawdown of the tributaries, in conjunction with habitat modifications throughout the watershed, likely led to the extinction of the Clear Lake splittail (*Pogonichthys ciscoides*), another stream-spawning native fish restricted to the Clear Lake watershed (Moyle 2002, pp. 138–139; CDFW 2014, p. 27). The Clear Lake splittail spawned later in the season than the Clear Lake hitch does, and, as the tributaries began to dry earlier in the season, Clear Lake splittail young were not able to migrate to the lake (Cook et al. 1966, p. 146; Moyle 2002, pp. 138–139; CDFW 2014, p. 27).

Water extraction continues throughout the watershed today for agricultural and domestic purposes. Both surface and ground water are being diverted from Clear Lake tributaries (legally and illegally) (CDFW 2014, p. 27), with the primary supply, about 60 percent, coming from groundwater sources in an average year (County of Lake 2014, entire; Clear Lake Hitch Summit Agenda and Presentations 2023, p. 18). These particular diversions are legal extractions conducted under riparian and water rights associated with land ownership. Surface water is diverted via intake pumps, and groundwater is extracted via the installation of shallow wells near the tributary channel where they capture underflow (CDFW 2014, p. 27). In 2013 and 2014, water rights users in Kelsey Creek used 85 and 134.5 million gallons of water, respectively, as well as 31.4 million gallons in each of those years from Adobe Creek. In addition, from 2008 to 2014, 18 private water wells were permitted for installation along the two creeks. Although this amount of water withdrawal is legally permissible, it is unknown what effects this amount of water extraction is having on the hydrology of these tributaries and the Clear Lake hitch (Big Valley 2015, p. 4).

Water extractions, both legal and illegal, are often cited as one of the primary reasons for the reduction in the Clear Lake hitch's population; however, although stream gauges are installed in some of the tributaries and continue to be installed, studies on the effects that water extraction is having on Clear Lake tributaries or the Clear Lake hitch are still in initial stages (Clear Lake Hitch Summit Agenda and Presentations 2023, pp. 63–72). The CDFW compared stream flow conditions at the U.S. Geological Survey (USGS) gauge on Kelsey Creek (USGS Station 11449500) and catch data from the early 1990s. Both 1990 and 1991 were considered dry water years with below average tributary flow during the spring; however, the highest number of hitch were captured during seining efforts during those years. Flow conditions improved to average or above average for the following 3 years, but the number of fish captured declined (CDFW 2014, p. 27). Clear Lake hitch abundance varies from year to year due to a number of factors, including streamflow. More data are needed to better understand the relationship between streamflow and population numbers as well as the effects that water extraction has on streamflow.

Historical land conversion was not only for the purposes of agricultural crops but also for livestock. The effects of livestock on the land can include overgrazing and the subsequent effects of exacerbated erosion and water quality degradation. Although overgrazing no longer appears to be occurring in the Clear Lake watershed, it was an issue until the mid-20th century. Past overgrazing in the watershed resulted in the loss of streamside vegetation, which decreased soil stability and increased the rate of runoff within the creeks, effectively reducing the amount of time water is retained within the channel (Murphy 1948b, p. 106; Suchanek et al. 2003, p. 1257). Although the amount of grazing pressure has decreased in the watershed, the impacts of past practices are still contributing to the issues seen in the watershed today.

Clear Lake hitch are affected by passage barriers that block the ability of the fish to move up and downstream. The lack of adequate tributary flow can act as a barrier to migrating fish, reducing the amount of available spawning habitat, and leaving young stranded before they can migrate to the lake. However, even when flow conditions allow for migration, most of the tributaries in the watershed contain physical barriers that prevent hitch passage, reducing the amount of spawning and rearing habitat available.

The installation of dams, diversions, roadways, and crossings have had a negative impact on migrating hitch by eliminating access to portions of stream with suitable spawning habitat or impeding passage during certain years until specific flow conditions (*i.e.,* high flow) are met (Suchanek et al. 2003, p. 1254; CDFW 2014, pp. 45, 69–70). Using a variety of data sources, CDFW estimated that more than 92 percent of the Clear Lake hitch's historical 180 stream miles of tributary habitat is currently blocked or has reduced access due to the presence of barriers (CDFW 2014, pp. 24–25). In addition, since the presence of a barrier on a spawning stream reduces the amount of available spawning habitat, reproducing adults have to compete for available spawning substrate. Fertilized eggs have been known to accumulate just below a barrier to the point that they will die due to oxygen deprivation (Robinson Rancheria 2015, p. 1).

Numerous dam structures can be found throughout the Clear Lake watershed, including dams on Kelsey, Adobe, Highland Springs, and Manning creeks. These dams were installed in the mid- to late 20th century and were installed primarily for irrigation and recreation (Suchanek et al. 2003, p. 1248). In addition, CDFW identified potential barriers on Lyon's Creek, Scott's Creek, Seigler Canyon Creek, Clover Creek, and Kelsey Creek (Ewing 2016a, entire). Additional barriers in the watershed include flood and water infrastructure that are not regularly maintained that may block hitch passage (CDFW 2014, p. 69). Flood control projects have also contributed to increased nutrient and sediment transport in the watershed by channelizing and armoring tributaries with rip-rap and by reclaiming large portions of wetland habitat that once surrounded the lake (CDFW 2014, p. 29). There are almost 14 miles of levee structures that are maintained by the U.S. Army Corps of Engineers (USACE) on Scotts, Middle, Clover, and Alley creeks (USACE 2012, p. 3). The loss of wetland habitat and increased nutrient and sediment transport further exacerbates water quality issues within Clear Lake, likely reducing hitch survival. Further, the loss of wetland habitat to install the flood projects reduced the amount of rearing habitat for juvenile hitch, reducing the likelihood of successful recruitment. The lake habitat for the Clear Lake hitch is also affected by habitat loss, degradation, and modification through wetland/tule habitat loss, cyanobacteria

(blue- green algae) blooms, and fish kills. Because of the impacts from the historical land conversion, surrounding wetland habitats were lost, essentially removing Clear Lake's natural filter. Over time, increasing amounts of sediment and nutrients from the degraded tributaries were transported directly into the lake, and nutrient inputs from surrounding urban and agricultural development ended up in the lake. This increase in nutrients and sediments entering Clear Lake degraded its water quality, resulting in increased cyanobacteria blooms that contributed to or caused periodic fish kills.

With the loss of the extensive tule expanses within the lake's nearshore habitat, there has been an increase in the amount of sedimentation and nutrients entering the lake (Prine et al. 1975, p. 21). Wetlands act as a filter for sediments and nutrients transported from the tributaries into the lake and the loss of these large wetland complexes directly surrounding the lake has had negative consequences to Clear Lake's water quality (Richerson et al. 1994, pp. III–1, V–1, VIII–1; Suchanek et al. 2003, p. 1255). One result from the wetland loss and water quality impacts is blue-green algae blooms that occur in Clear Lake from phosphorus input.

The blue-green algae, a cyanobacteria and not an actual alga, will float to the surface of the lake during the day and can form large mats or scums. These mats will either be broken down or re-submerged into the lake via wind action or will deteriorate from sun exposure. Phosphorus is found naturally in underlying sediments within the Clear Lake watershed (Richerson et al. 1994, p. V–99), and the degradation of tributaries have exposed those sediments, allowing for transport into the lake during rain events. A major factor in the persistence and formation of cyanobacteria blooms in Clear Lake relates to periods of anoxia (deficiency of oxygen), and where phosphorus is released from sediments (Florea *et al.* 2022, p. ii). Blue-green algae blooms can be toxic to fish (Gorham 1960, p. 242; Prine et al. 1975, p. 23; Richerson et al. 1994, p. III–9); however, it is unknown what impact they have on the Clear Lake hitch.

Fires have occurred naturally in the Clear Lake watershed as part of the ecological cycle; however, with Euro-American settlement in the middle of the 19th century, widespread intentional burning occurred throughout the watershed to clear brush or promote grass growth for livestock grazing (Suchanek et al. 2003, pp. 1243–1245, 1246–1247). Numerous fires have occurred in the Clear Lake area during the 20th century, with several large ((10,000+ acres (ac), 4047 hectares (ha)) fires occurring directly in the watershed (Suchanek et al. 2003, pp. 1244, 1248). The fire seasons in California during 2017, 2018, and 2020 were some of the worst on record. The 2018 Mendocino Fire Complex, a portion of which occurred in Lake County, was the third largest fire on record in California (CalFire 2022a, entire). Past fire suppression practices within the State of California have reduced the occurrence of fire, but due to the accompanying fuel accumulation, these practices have made fires more devastating when they do occur (Suchanek et al. 2003, p. 1247). Fire activity within the watershed results in increased erosion and bank incision, which channelize the stream and increase water turbidity; fire activity is likely to continue to increase within the Clear Lake watershed (CalFire 2022b, entire). Channelization can decrease the amount of time water is retained within the tributary channel (Murphy 1948b, p. 106; County of Lake 1992, p. 13). A reduction of flow in the tributaries during the spawning season can eliminate or greatly reduce the likelihood for successful reproduction and/or recruitment, and due to the Clear Lake hitch's very narrow range, the effects of channelization can impact the subspecies' viability.

Summary of Habitat Loss, Degradation, And Modification

Habitat loss, degradation, and modification due to agricultural and urban development, pesticide use, increased fire activity, and legacy impacts from past mining activities, past deforestation, and historical grazing practices will continue to affect the Clear Lake hitch at the individual, population, and subspecies level into the future throughout its range.

The Clear Lake hitch habitats that are affected include the tributaries and lake habitat. Impacts to both habitat types will affect the Clear Lake hitch by reducing survival and recruitment, which reduces resiliency by decreasing the size of the overall population. For the tributaries, the loss of consistent flow during the spawning season is seen throughout the Clear Lake hitch's range. This influence is affecting the hitch at the individual, population, and subspecies level and is likely to continue into the future. The loss of consistent tributary flow, loss of wetland/tule habitat, and reduced lake water quality, has reduced, and will continue to reduce, population resiliency by reducing reproductive success, early life stage survival, and the likelihood of recruitment. Loss of resiliency may reduce the Clear Lake hitch's overall representation and redundancy because fewer individuals spawn in each of the tributaries and natal habitat types. The reduction in resiliency may result in a reduction to the hitch's overall representation and redundancy.

There are no existing regulatory mechanisms or management actions that fully ameliorate habitat loss, degradation, and modification within the watershed, primarily because much of the degradation occurred in the past, although the effects are still occurring today and will continue into the future. There are planned activities associated with the Clear Lake watershed, the Middle Creek Flood Damage Reduction and Ecosystem Restoration Project, that will benefit improve water quality, increase available wetland habitat for the Clear Lake hitch and mitigate some of the ongoing habitat loss, degradation, and modification.

Construction of this project would greatly benefit juvenile hitch by providing increased cover from predators and competitors, and increased prey abundance The county's Clear Lake Shoreline Ordinance has prohibited the destruction of tule on residential properties along the shoreline around Clear Lake and requires full mitigation for any tule habitat that is destroyed. This ordinance benefits the Clear Lake hitch by providing a consistent amount of tule habitat for juveniles. In addition, the county recently began a tule planting initiative that informs the public about the importance of tule habitat and how to plant tule (Lake County 2024a, entire).

Predation

Non-native fish introduced into Clear Lake for recreational or biological control purposes are known to prey upon the Clear Lake hitch and all introduced piscivorous (fish-eating) fish species in Clear Lake are potential predators of Clear Lake hitch. Clear Lake hitch have been found in the stomach contents of nonnative fish species in the Clear Lake watershed including largemouth bass (*Micropterus nigricans*) and channel catfish (*Ictalurus punctatus;* Macedo 1994, p. 5; Moyle *et al.* 1995, pp. 154 –155; Moyle *et al.* 2014, p. 10). Mississippi silversides (*Menidia audens*) are also known to prey on larval fish, so it is likely some predation of Clear Lake hitch larvae by silversides is occurring in Clear Lake (Bennett and Moyle 1996, pp. 526, 529; Moyle *et al.* 2014, p. 9–10). The nonnative species predation will

continue to affect the Clear Lake hitch at the individual, population, and subspecies level into the future throughout its range. Nonnative species predation pressure within Clear Lake impacts the hitch by reducing survival and recruitment, which reduces resiliency by decreasing the size of the overall population.

Predation pressure within the tributaries to Clear Lake impacts the hitch by reducing survival, reproduction, and recruitment, which further reduces resiliency by decreasing the size of the spawning population in any given year and by reducing the overall population altogether. This loss of resiliency may reduce the hitch's overall representation and redundancy because it results in fewer individuals spawning in each of the tributaries and natal habitat types.

Competition

Competition from other nonnative aquatic species affects the Clear Lake hitch by reducing the available resources for breeding, feeding, and sheltering. For example, largemouth bass (*Micropterus nigricans*) feed on insects and zooplankton, directly competing with both juvenile and adult hitch for food resources (Moyle and Holzhauser 1978, pp. 577–578, 581). Threadfin shad (*Dorosoma petenense*) and Mississippi silversides also compete with the Clear Lake hitch because they depend on the same aquatic prey base (Anderson et al. 1986, entire; Bairrington 2000, p. 33; CDFW 2014, p. 35). During years when silverside or threadfin shad abundances are especially high, they could reduce or deplete prey resources on which the hitch depends. A comparison of hitch trend data and abundances of silversides and threadfin shad suggests there may be a correlation between their abundances (CDFW 2014, p. 35), but more detailed studies need to be completed. There are currently no regulatory mechanisms that address competition by non-native species.

Mercury Mining Contaminants

Historically, small-scale commercial mining operations along the shores of Clear Lake occurred in 1864 and 1865. Originally, the mining included borax and sulfur (Suchanek et al. 2003, p. 1253). Large-scale commercial sulfur extraction along the eastern shore of Clear Lake began in 1865, when the Sulphur Bank Mercury Mine was established. The sulfur mining operation switched over to mercury mining in 1873, after mercury sulfide deposits were found beneath their sulfur source. Early extraction methods were not as destructive; however, in 1927, the mine began to implement open- pit mining at a large-scale level and would bulldoze any waste products into the lake (Richerson et al. 2008, p. A259). The company continued to mine sporadically throughout the 1950s until the Sulphur Bank Mercury Mine was officially closed in 1957, although waste continued to contaminate the lake well into the 1990s (Suchanek et al. 2008, p. A153).

The highest concentrations of mercury were found in the Oaks Arm area, near the southeastern area of the lake, which is where the Sulphur Bank Mercury Mine is located; however, elevated mercury levels have also been detected lake-wide (Richerson et al. 2008, p. A271). The use of heavy ground-moving equipment associated with the open-pit mining also likely contributed to the algal blooms seen in the lake; this equipment can excavate and disturb large swaths of sediments, which increase nutrient runoff (Richerson et al. 2008, p. A260).

Mercury and other mining-associated contaminants have entered the lake via erosion of waste piles, purposeful dumping/bulldozing of mine waste, atmospheric deposition, and subsurface drainage (Richerson et al. 2008, p. A275). Since 1992, the Environmental Protection Agency (EPA) has implemented numerous remediation projects to address the continued mercury contamination originating from the Sulphur Bank Mercury Mine. The remediation projects include the removal of waste rock piles that erode and discharge mercury, removal of contaminated soil from residential areas, installation of diversions to prevent contaminated water and sediments from entering Clear Lake, closure of three abandoned geothermal wells, capping of mine waste used to build an old road, and installation of two test sediment covers to contain mercury- contaminated sediment within Clear Lake (Richerson et al. 2008, pp. A265, A275; EPA 2019, entire).

The Sulphur Bank Mercury Mine became an EPA Superfund Site in 1990, due to the elevated mercury levels found in Clear Lake's larger piscivorous fish (Curtis 1977, p. 1; Suchanek et al. 2003, p. 1253; Thompson et al. 2013, p. 19). Elevated levels of mercury in fish can significantly impair reproductive success; however, effects can vary based on a multitude of factors, including species and life stage, and there are no specific studies for the Clear Lake hitch (Crump and Trudeau 2008, pp. 902, 904; CDFW 2014, pp. 32–33). Mercury concentrations found in developed hitch caught in Clear Lake in 2019 and 2020 averaged 0.14 milligrams per kilogram (mg/kg) (Pierce et al. 2022, entire), which exceed the Regional Water Quality Control Board's proposed target of 0.09 mg/kg for fish in trophic level 3, which includes the Clear Lake hitch (CEPA 2008, p. 1). Although these levels may exceed the Regional Water Quality Control Board's target, the best available science does not provide the lethal concentration of mercury specific for Clear Lake hitch or levels that may cause acute or chronic health effects to the Clear Lake hitch, or whether they are currently exposed to those levels in Clear Lake. The threat of mercury mining contaminants impacts the Clear Lake population and has not affected the Thurston Lake population.

Climate Change

Climate change affects the Clear Lake hitch and its habitat due to shifts in normal weather patterns. Changes in temperature and precipitation regimes can affect water quality and quantity for the subspecies and can exacerbate other effects, such as increased drought and fire frequency. Annual average air temperatures in California have increased by 1.5 °F (0.83 °C) since the beginning of the 20th century (Bales 2013, p. 2).

Temperatures are expected to continue to increase in California's North Coast Region, which includes Lake County (Grantham 2018, entire). Drought conditions within the Clear Lake watershed can have detrimental effects on the Clear Lake hitch by reducing the amount of flow within the tributaries over the spawning season, reducing water quality in the lake, and possibly reducing emergent vegetation growth in the lake. In 1946 and 1947, there was almost a complete lack of spawning runs due to the lack of water flow in the tributaries (Murphy 1948b, p. 105). However, the hitch's ability to spawn along the lake shore provides an alternative to tributary spawning for at least a small proportion of the population.

More arid conditions can impact the Clear Lake hitch by reducing the amount of water that enters, and the time period that water is retained within, the tributaries and wetland habitats that the hitch requires for spawning and rearing. Increases in aridity also reduce wetland/emergent vegetation growth, which the hitch requires for rearing and for cover from predators. All of these factors can impact the reproductive success and recruitment of the hitch; these factors could also reduce the hitch's survival if flows drop too drastically in the tributaries and wetland habitats, or if

hitch are subject to increased predation due to a reduction in cover from aquatic vegetation.

A reduction of flow in the tributaries during the spawning season can eliminate or greatly reduce the likelihood for successful reproduction and/or recruitment, and due to the Clear Lake hitch's very narrow range, the effects of drought will impact the entire subspecies. The ability to spawn along the shore provides for some redundancy within each population, but it is unknown whether shore spawning would be able to support a viable population in the lakes over the long term. Having a longer lifespan (4 to 6+ years) is likely an adaptation to variable environmental conditions, but prolonged droughts can have devastating effects on the overall population, especially in conjunction with other factors that are currently acting on the Clear Lake hitch.

There have been numerous efforts over the last 10 years to save Clear Lake hitch that become stranded in pools within the tributaries when the tributaries began to rapidly dry up. In March 2014, 197 individuals were rescued from two pools within Adobe Creek, and the surviving fish were released into Kelsey Creek (Ewing 2014a, entire). A few months later, in June 2014, more than 1,400 hitch were rescued from Cooper Creek and 389 hitch were rescued from Adobe Creek when the flow within those creeks began to rapidly drop. The surviving individuals from both rescues were released into Rodman Slough and at the Konocti Vista Casino boat ramp, respectively (Ewing 2014e, pp. 3, 6). Unfortunately, during visual spawning surveys that same year, approximately 300 adult hitch were found dead in a portion of Adobe Creek that had dried (Ewing 2014c, p. 7).

During the spring of 2018, numerous young of year were stranded in a pool within Cole Creek when the water flow began to rapidly drop. The creek no longer had continuous flow into the lake, and the small pool where the fish were stranded would have eventually dried, killing all of the 3,100+ young fish. Fortunately, members of Robinson Rancheria and CDFW were able to rescue the fish and transport them for release at Clear Lake State Park, which is located where Cole Creek enters the lake (Ewing 2018a, p. 1). In April 2022, 268 individuals were rescued from two pools within Adobe Creek and transported to Konocti Casino Harbor on Clear Lake where they were released (Ewing 2022a, p. 1). On August 8, 2022, 295 hitch were rescued from a pool off of Cooper Creek; the rescued hitch were translocated to Upper Blue Lake for release (Santana 2022, p. 2). The effects of climate change will continue to affect both Clear Lake hitch populations, Clear Lake and Thurston Lake.

Regulatory mechanisms and management actions that are or could potentially provide some protection from the effects of climate change include the California Global Warming Solutions Act. This Act addresses climate change by reducing greenhouse gas emissions within California. There are no regulatory mechanisms or management actions that fully address the effects of the climate change.

Synergistic Effects

Multiple influencing factors can act on a species or its habitat at the same time, which can result in impacts that are not accounted for when factors are analyzed separately. Factors that appear minor when considered alone may have greater impacts on individuals, populations, or habitat when analyzed in combination with other factors.

The Clear Lake hitch evolved in Lake County, California, which has always had a highly variable climate with natural periodic droughts. However, the degradation and loss of water retention within their spawning streams and the loss of large stretches of suitable spawning habitat due to various instream barriers has likely reduced reproductive success and recruitment. During drought conditions this can reduce or eliminate all tributary- based spawning in a given year. If drought conditions persist over multiple years, stream- based reproduction can also be reduced or eliminated for multiple years. Furthermore, climate change projections show the Clear Lake area will experience more varied precipitation and higher air temperatures during the spring, which could result in even less water flow being retained within the tributary streams during the hitch's spawning season (Pierce *et al.* 2013, pp. 842, 844, 848–850. Although the hitch has the ability to spawn within the lake, it is unknown whether that method of reproduction would be able to sustain a viable population of hitch in Clear Lake.

Additionally, groundwater extraction for agriculture and other uses likely affects the Clear Lake hitch and its habitat, particularly combined with other chronic threats, such as habitat loss, degradation, and modification along with climate change that are synergistically acting on the subspecies. Water extraction in the summer is likely to lower the water level in pool habitat that acts as refugia for the subspecies in disconnected tributaries until those tributaries become reconnected by spring rains. It is the loss of this pool habitat that affects the Clear Lake hitch resiliency.

The combination of wetland habitat loss and drought can increase predation pressure and competition. Past habitat loss has left only a small proportion of wetland habitat surrounding Clear Lake and drought conditions can reduce the amount of emergent vegetation growth within those remaining wetland habitats. This reduction in emergent vegetative growth reduces the amount of cover the hitch uses to hide from predators, increasing predation pressure. It can also increase competition as more fish concentrate into this limited habitat type.

Conservation Efforts and Regulatory Mechanisms

The Clear Lake hitch is protected through existing regulatory mechanisms and management actions that result in conservation of the subspecies or its habitat or both. Additional actions from Tribes and other interested groups also provide a benefit to the subspecies. Below, we present some of the ongoing efforts that provide conservation benefits to the Clear Lake hitch or its habitat or both from Federal, State, Tribal, and local regulations and management plans.

I. Federal

U.S. Forest Service (USFS)

The Clear Lake hitch has been designated a USFS sensitive species. Species identified as sensitive by the USFS are species in which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution, or both. The designation of sensitive species ensures USFS: assists States, including California, in achieving their goals for conservation of endemic species; as part of the process under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), reviews programs and activities, through a biological evaluation, to determine their potential effect on sensitive species; avoids or minimizes impacts to species whose viability has been identified as a concern; if impacts cannot be avoided, analyzes the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole; establishes management objectives in cooperation with the States when projects on

National Forest System lands may have a significant effect on sensitive species population numbers or distributions; and establishes objectives for Federal candidate species, in cooperation with the Service or National Marine Fisheries Service, and the States. Most of the Clear Lake hitch's range is on private land and only the headwaters of a few tributaries to the east of Clear Lake fall within USFS lands.

II. State

California Endangered Species Act (CESA)

On August 6, 2014, the CFGC determined that the Clear Lake hitch warranted listing as a threatened species under the CESA due to the present or threatened modification or destruction of the subspecies' habitat, predation on and competition with the hitch, and the anticipated impacts of climate change (CDFW 2014, pp. 1–2). Section 2067 of the California Fish and Game Code defines a ''threatened species'' as a native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by the State. As a threatened species under the CESA, the take of Clear Lake hitch individuals is prohibited unless the take is authorized by a State-issued permit.

However, CESA regulations only apply to the take of individuals (*i.e.,* they do not apply to the destruction or modification of habitat). It should be noted that California's definition of take (see section 86 of the California Fish and Game Code) is not the same as the Act's definition of take (16 U.S.C. 1532(19)).

California Environmental Quality Act (CEQA) of 1970

The CEQA does not regulate land use but requires all local and State agencies in California to avoid or minimize environmental damage, where feasible, during the course of proposed projects. The CEQA provides protection for species that are State-listed or federally listed as endangered, threatened, or rare. Compliance with the CEQA may be required for watershed restoration work and any restoration work that requires a ''lake or streambed alteration agreement'' (also known as a ''1600 agreement''; see sections 1600–1616 of the California Game and Fish Code).

Sustainable Groundwater Management Act (SGMA)

The SGMA is a California State law that provides a framework for sustainable groundwater management in California. Under section 10933(b) of the California Water Code, groundwater basins throughout the State have been classified into four categories of prioritization (high, medium, low, very low). Phase 1 of the categorization process was finalized in January 2019, and 458 basins were prioritized during that phase. Fifty-seven basins were categorized under phase 2, which was finalized on December 17, 2019 (DWR 2020, p. AD–3). The SGMA requires water agencies and governments of high- priority and medium-priority basins to reduce overdraft and bring groundwater basins into balance. The State of California ensures the SGMA goals are met as planned.

Several groundwater basins in the Clear Lake watershed were prioritized during the phase 1 prioritization. The Big Valley basin to the southwest of Clear Lake received a medium prioritization, whereas the other eight basins in the watershed (Scotts Valley, Upper Lake Valley, Middle Creek, Long Valley, High Valley, Clear Lake Cache Formation, Burns Valley, and Lower Lake Valley) were given a low priority. The high- priority and medium-priority basins will be managed by a group of local agencies, referred to as ''groundwater sustainability agencies,'' and they will be tasked with reaching sustainability in their basin within 20 years of implementing their groundwater sustainability plans. Groundwater sustainability agencies have been formed for the Big Valley and Scotts Valley basins, and a groundwater sustainability plan was developed for the Big Valley basin and published in January 2022 (DWR 2019a, entire; DWR 2019b, entire; DWR 2019c, entire; DWR 2022, entire). Reducing overdraft from groundwater pumping in the Big Valley basin could improve flow conditions in Thompson Creek, Adobe Creek, Kelsey Creek, Cole Creek, McGaugh Slough, and Manning Creek and could provide sufficient water quantity for the Clear Lake hitch to traverse the tributaries during their spawning season.

III. Local

Clear Lake Integrated Watershed Management Plan (CLIWMP)

The local resource conservation districts developed CLIWMP to document the historical and current conditions of the Clear Lake watershed and any management actions that have been, or are currently being, implemented. Actions to enhance and/or protect the watershed are then identified using that background information and timeframes for each action are described. The CLIWMP describes specific implementation actions needed to create an environmentally and economically healthy watershed, both for the benefit of the existing local community and for future generations (County of Lake et al. 2010a, entire). Implementation of the actions described in the CLIWMP would benefit the Clear Lake hitch by increasing the amount of wetland habitat used for rearing, improving fish passage within the tributary streams, and restoring degraded tributary stream and lake habitats. In addition to the CLIWMP, the local conservation districts also developed watershed assessments for Scotts, Middle, and Kelsey creeks. The purpose of those assessments is similar to the CLIWMP; they document the historical and current conditions of those watersheds and any management actions implemented. The assessments will aid in educating watershed users and landowners on the condition of that particular watershed, the management and restoration actions that need to be implemented to improve conditions, and how the conditions of those particular watersheds impact the condition of Clear Lake (County of Lake et al. 2010b, entire; County of Lake et al. 2010c, entire; County of Lake et al. 2010d, entire). Aggregate Resources Management Plan

Lake County developed an Aggregate Resources Management Plan (County of Lake 1992, entire) to address concerns about the impacts of gravel mining on the watershed. The plan describes the policies regarding mining in specific areas, identifies areas deemed as suitable for future mining projects, and informs the public about mining in Lake County. The plan calls for a moratorium on mining in certain creeks and limits mining activities to certain areas (County of Lake 1992, pp. 83–86). The regulation of gravel mining in the county has reduced the rate of erosion in the tributaries and increased the amount of riparian habitat along the stream channels, where the Clear Lake hitch occurs. Although instream sources of gravel are no longer the primary source of aggregate in Lake County because gravel is now acquired from other sources, illegal gravel mining or extraction has been known to occur in the watershed (CEPA 2008, pp. 8, 89; B. Ewing *in litt.* 2020).

Middle Creek Flood Damage Reduction and Ecosystem Restoration Project

The Middle Creek Flood Damage Reduction and Ecosystem Restoration Project (Middle Creek Project) is both a flood risk reduction project for urban and agricultural areas along the northern end of Clear Lake and an ecosystem restoration project that will improve degraded wetland habitat and water quality in Clear Lake. The Middle Creek Project area was once approximately 1,400 ac (567 ha) of wetland habitat that was lost in the early 1900s through the construction of levees and conversion to agricultural use.

Because these levees are no longer functional and there is an urgent need to restore surrounding wetland habitats to improve the lake and the watershed, Lake County requested USACE assistance to evaluate the project in 1995. The Middle Creek Project consists of acquiring reclaimed land, breaching existing levees to flood historical wetland and floodplain areas, and reconnecting Scotts and Middle creeks. Final NEPA and CEQA review was completed in 2003 and 2004, respectively, and the Middle Creek Project was authorized under the Water Resources Development Act of 2007 (33 U.S.C. 2201 *et seq.*). Federal funding for the Middle Creek Project has not yet been appropriated to start project design; however, funding for land acquisition has been acquired (USACE 2012, pp. 1–2; USACE 2023, entire).

The Middle Creek Project will benefit the Clear Lake watershed by reducing the amount of sediment and nutrients entering Clear Lake, improving overall water quality. It will also increase the existing amount of wetland habitat within the Clear Lake watershed by approximately 79 percent (USACE 2012, p. 3). If the Middle Creek Project were to be implemented, it would benefit adult hitch by improving the water quality of Clear Lake, which would likely reduce the incidence of large fish kills. The Middle Creek Project would also greatly benefit juvenile hitch by increasing the amount of wetland habitat surrounding the lake, providing increased cover from predators and competitors, and increased prey abundance.

Clear Lake Shoreline Ordinance

The destruction of woody species and tule on residential properties along the shoreline around Clear Lake is prohibited under section 23–15 of the Clear Lake Shoreline Ordinance. These types of vegetation can be managed via mowing, pruning, or trimming, but those activities cannot result in the death of the plant. In addition, the ordinance applies a no-net-loss program for commercial, resort, or public properties that require mitigation for any areas of vegetation cleared by providing replacement plantings (County of Lake et al. 2010a, pp. ES–16, 3–10; CDFW 2014, p. 42). The measures associated with this ordinance benefit the Clear Lake hitch by providing a consistent amount of tule habitat for juveniles.

Clear Lake Hitch Conservation Strategy

A group including local Tribes, local government, State agencies, and Federal agencies have been working on the development of a conservation strategy for the Clear Lake hitch. The strategy, which is still in draft form, documents the past and current status of the subspecies, describes the negative influences that have resulted in the subspecies' current status, and identifies the actions that will address those negative influences in order to maintain a viable population of Clear Lake hitch throughout the subspecies' range. This conservation strategy will provide benefits to the subspecies through public outreach regarding Clear Lake hitch conservation; it will also direct funds to implement actions or projects that will specifically benefit the hitch.

Clear Lake Hitch Task Force

In August 2022, Tribal leaders and members of the Tribal Environmental Protection Agencies representing the Big Valley Rancheria of Pomo Indians, Elem Indian Colony Pomo Tribe, Robinson Rancheria Band of Pomo Indians, and the Habematolel Pomo of Upper Lake went before the CFGC to express their concern for the status of the Clear Lake hitch. To address these concerns and focus attention on the subspecies, the Clear Lake Hitch Task Force (Task Force) was formed. The Task Force had its first meeting on September 14, 2022, and consisted of Tribal and CDFW representatives.

Since 2022, the Task Force has expanded to include the California Department of Water Resources, State Water Resources Control Board, Central Valley Regional Water Board, Lake County Water Resources Department, Fish and Game Commission, California Natural Resources Agency, Service, USGS, California Conservation Corps, Bureau of Land Management (BLM), USACE, and USFS. The Task Force's mission involves collaborative planning for long-term responses to the decline in the Clear Lake hitch population, coordinating projects, identifying funding sources, and facilitating information exchange among agencies. The Task Force meets monthly and has held three summits to help relay information and coordinate projects between different agencies.

IV. Miscellaneous

Lake County, the California Department of Transportation, USFS, State Water Resources Control Board, and BLM have undertaken various actions to prevent or reduce nutrients and contaminants from entering Clear Lake, or to track the amount of water being used throughout the watershed (West Lake Resource Conservation District, undated, entire; CDFW 2014, p. 41). These actions include the Eightmile Valley Sediment Reduction and Habitat Enhancement Project, for which BLM and the Scotts Valley Band of Pomo Indians received a grant (CDFW 2014, p. 41). CDFW has two conceptual area protection plans (CAPPs) that cover different areas of the Clear Lake watershed. A CAPP allows different organizations and agencies to apply for land acquisition funding through the Wildlife Conservation Board. Both plans focus on the protection of wetland and riparian habitats, which would benefit the Clear Lake hitch during its early life stages (CDFW 2014, p. 42). Lastly, the State Water Resources Control Board issued draft emergency information order regulations for the Clear Lake watershed in September 2023. These regulations were adopted by the Water Resources Control Board on December 6, 2023. These regulations allow the Water Resources Control Board to gather information on water usage, particularly groundwater pumping, in the Clear Lake watershed and learn how, if at all, it influences surface tributary flow (State Water Resource Control Board 2023, entire).

Lastly, the CDFW has begun to address some of the fish passage barriers in the Clear Lake hitch's spawning tributaries by installing fish ladders. The reconstruction of one project included installation of holding pools for the fish to rest as they move upstream and breaks in the ladder to help slow the rate of water flow (Ewing 2017c, entire).

Cumulative Effects

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the subspecies. To assess the current and future condition of the subspecies, we evaluate the effects of all the relevant factors that may be influencing the

subspecies, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire subspecies, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-effects analysis.

Current Condition

In order to evaluate the current condition of the Clear Lake hitch, we describe the resiliency of each population along with the redundancy and representation of the subspecies. We considered demographic factors and habitat elements to evaluate the population-level resiliency. We divided the population in Clear Lake to ensure a more focused analysis regarding how different areas of the lake contribute to the subspecies' survival.

We established that there are two separate populations of Clear Lake hitch within the Clear Lake watershed: one is found in Clear Lake and its associated tributaries and small lakes (*i.e.,* Blue Lakes and Tule Lake), and the other is in Thurston Lake and its associated tributary. Because Thurston Lake is not currently hydrologically connected to Clear Lake and possibly never was, we do not anticipate it to be connected in the future. The Clear Lake and Thurston Lake populations were further delineated into units to capture the aquatic habitat features at a local, sub-watershed level. We then grouped some of the smaller delineated units into five ''analysis units'' using otolith (calcium carbonate structure found in the inner ear of the Clear Lake hitch) strontium signatures that indicated natal origins can be assigned to one of five strontium isotope groups (SIGs) throughout the watershed (Feyrer *et al.* 2019a, entire). The use of adult otoliths for the natal habitat strontium groupings indicates that those areas associated with the SIGs are contributing to reproduction and recruitment. The terms ''analysis unit'' and ''SIG'' may be used interchangeably for this analysis.

We delineated six analysis units across the subspecies' range. Thurston Lake and Thurston Creek are described as a single analysis unit. The Clear Lake population includes five analysis units described according to the general location: Cole Creek; Kelsey Creek; Adobe Creek and Clear Lake; Rodman Slough; and Middle, Clover, and Siegler Canyon creeks (SIGs 1 through 5, respectively; Service 2024, p. 34). Additional description of the populations and analysis units can be found in the SSA report (Service 2024, pp. 26–28); see table 2, below, for a list of the AUs.

In order to determine resiliency, we assessed the conditions at the population and analysis unit levels. We used demographic and habitat factors associated with each population. The demographic factors include reproduction, recruitment, and survival at both the adult and juvenile life stages. The habitat factors we used include water quantity (tributaries) and quality (lake) and wetland/tule habitat condition.

Influencing those factors is the quality and accessibility of Clear Lake hitch habitat, which determines how well the spawning areas allow for successful reproduction, whether the nearshore nursery areas allow for young-of-year survival and subsequent recruitment, and whether individuals can move between tributary spawning habitats and the lake. Within the tributaries, water quantity and quality are important factors influencing survival at all life stages, reproductive success, and recruitment, and water quantity and quality are important for connectivity between the tributaries and lakes. Environmental stochastic events that have the potential to affect the subspecies include severe storms, drought, contaminant exposure, and the modification of habitat via natural (*i.e.,* fire, drought, etc.) and anthropogenic (*i.e.,* conversion to agriculture, vegetation management) means. Additional information regarding the resiliency factors can be found in the SSA report (Service 2024, pp. 28–34).

We describe the population and analysis unit resiliency conditions using categories of high, medium, and low (with transitional stages). The methodology for determining the condition category includes assessment of the demographic and habitat factors within each analysis unit and within each population (Service 2024, p. 79). An overall high condition for a population is an indicator of high probability of population persistence. Populations in high condition have: accessible tributaries available throughout the spawning season, different natal habitats available for reproduction, individuals that are reproducing successfully and populations that are actively recruiting, and a sufficient amount and quality of spawning and rearing habitat to allow for varying population densities. An overall moderate condition is an indicator that probability of persistence for that population may be compromised by the lack and/or degradation of one or more of the subspecies' needs, and a low overall condition indicates low probability of population persistence due to the lack and/or degradation of multiple of the subspecies' needs. An extirpated condition indicates no probability of population persistence due to lack and/or degradation of all of the subspecies' needs. Conditions of low/extirpated, moderate/low, and high/moderate are transitionary between each of the qualitative categories.

In order to determine the current population estimates and distribution, we used recent data (2015–2023) from surveys conducted on spawning in the tributaries, along the lake shore, and throughout Clear Lake. That data also informed the resiliency analysis for each population and analysis unit. The demographic and habitat parameters used in the resiliency analysis for each population and analysis unit is provided in table 1, below (Service 2024, p. 67).

TABLE 1—DEMOGRAPHIC AND HABITAT FACTORS CONDITION CATEGORIES FOR POPULATION AND ANALYSIS UNIT RESILIENCY WITH HIGH CONDITION AS THE BEST CONDITION AND ZERO AS THE LOWEST CONDITION

Condition category	Demographic factor—reproduction	Demographic factor—recruitment	Habitat element—tributary water quantity	Habitat element—lake water quality
High	Overall total from reproduction analysis is high.	Overall total from recruitment analysis is high.	Water is retained within the tributaries throughout the spawning season.	Lake water is well oxygenated and minimally contaminated.

TABLE 1—DEMOGRAPHIC AND HABITAT FACTORS CONDITION CATEGORIES FOR POPULATION AND ANALYSIS UNIT RESILIENCY WITH HIGH CONDITION AS THE BEST CONDITION AND ZERO AS THE LOWEST CONDITION—Continued

Condition category	Demographic factor—reproduction	Demographic factor—recruitment	Habitat element—tributary water quantity	Habitat element—lake water quality
Moderate	Overall total from reproduction analysis is moderate.	Overall total from recruitment analysis is moderate.	Water is retained within the tributaries throughout a large portion of the spawning season.	Lake water is oxygenated most of the time, hypoxic conditions do occur periodically. Some contaminants are present, but not at lethal levels.
Low	Overall total from reproduction analysis is low.	Overall total from recruitment analysis is low.	Water is retained within the tributaries throughout a small portion of the spawning season.	Lake water is not well oxygenated and hypoxic conditions occur frequently. Contaminants are present, sometimes at lethal levels.
0 (Zero)	No reproduction	No recruitment	Water is not retained within the tributaries during any portion of the spawning season.	Lake water quality is uninhabitable.

Of the six Clear Lake hitch analysis units, for reproduction, there are currently three analysis units that are in moderate condition (SIGs 1, 2, and 4), and two analysis units that are in low condition (SIGs 3 and 5). The current recruitment condition for SIG 3 is high, moderate for SIGs 2 and 4, and low for SIGs 1 and 5. The current condition of lake water quality is at a low condition for all five analysis units, and the current condition for tributary water quantity is low for SIGs 1, 2, and 3, and moderate for SIGs 4 and 5. Currently, the Clear Lake population has three analysis units at a moderate condition (SIGs 2, 3, and 4), and two units at a low condition (SIGs 1 and 5), for an overall Clear Lake population resiliency of moderate (Service 2024, p. 83). The Thurston Lake population is currently in high condition and, therefore, has high resiliency. See table 2, below.

TABLE 2—SUMMARY TABLE OF CURRENT AND FUTURE RESILIENCY FOR EACH POPULATION (P) AND ANALYSIS UNIT (AU)

Population	Analysis unit	Current condition	Future condition scenario 1	Future condition scenario 2
Clear Lake		Moderate	Moderate/Low	Low.
	Cole Creek (SIG 1)	Low	Low	Low.
	Kelsey Creek (SIG 2)	Moderate	Moderate/Low	Low.
	Clear Lake, Adobe Creek (SIG 3).	Moderate	Moderate/Low	Low.
	Rodman Slough (SIG 4)	Moderate	Moderate	Moderate/Low.
	Middle Creek, Clover Creek, Seigler Canyon Creek (SIG 5).	Low	Low	Low.
Thurston Lake	Thurston Lake	High	Moderate	Moderate.

In describing the overall current condition, we not only include resiliency of each population and analysis unit, but also consider the representation and redundancy across the range of the subspecies. Because both populations of the Clear Lake hitch are narrowly distributed and occupy the same ecological niche, the subspecies has likely never had much environmental diversity and likely does not have much genetic diversity due to its endemism to a single watershed, suggesting inherently limited representation. Given the subspecies' narrow range, both populations of the subspecies (Clear Lake and Thurston Lake) could be affected simultaneously by large-scale events. However, the Clear Lake hitch uses different types of spawning habitats (tributary, lake, or interface between the two) across its narrow range, which may provide some current capacity to withstand a catastrophic drought event.

Because of the historical connectivity within a single, large watershed, Clear Lake provided better habitat conditions for the subspecies. Currently, Thurston Lake does not have the level of threats acting on the subspecies that are affecting the hitch in Clear Lake. Surveys in 2023 of the Clear Lake population show there is an influx of age classes, thus indicating there is reproduction occurring. This diverse demographic make- up of the subspecies' population in Clear Lake indicates that there is redundancy across subspecies' range and bolsters the subspecies' resiliency. Currently, the Clear Lake hitch has two extant populations: the Clear Lake population, which has a moderate resiliency; and the Thurston Lake population, which has a high resiliency. Both of these populations are able to withstand stochastic environmental variation. Representation and redundancy are similar to historical conditions, with both populations narrowly distributed and occupying the same ecological niche.

The current resiliency analysis uses the best available information; however, we recognize there are some uncertainties around the subspecies' life

history, including recruitment, and the factors that influence its viability. Some of the uncertainties include the lack of robust, statistically valid population or abundance estimates for the historical population of the Clear Lake hitch. Further, current population estimates are still in initial stages, as local Tribes, CDFW, and USGS are accruing more data to provide a more accurate rangewide population estimate. Because this information is not available, there is no baseline to compare for our current condition analysis; therefore, we had to use available demographic and habitat data to inform our analysis, which could result in an overestimation or underestimation of population resiliency.

There is some uncertainty in how successful recruitment is in the lower Clear Lake watershed, including within Clear Lake itself. Our analysis in the SSA report assumes reproduction is successful when adults are documented in the tributaries over the spawning season and that some lake spawning is successful (Service 2024, p. 70). It is possible these assumptions are overestimating how successful reproduction is, resulting in an overestimation of population resiliency.

Future Condition

In order to determine the Clear Lake hitch's viability in the future, we assessed the condition of the subspecies' resiliency, redundancy, and representation within a timeframe that we can make reliable predictions about the threats and the subspecies' response to the threats. The future conditions projections were timeframe we applied for the future conditions' analyses found that the most reliable timeframe extends out to the next 40 to 50 years. We considered two plausible future scenarios that represent the extremes of a range of future changes in environmental conditions and success of implemented conservation efforts. Using these two scenarios allows us to consider the full range of future possibilities for forecasting future viability of the subspecies and incorporates any uncertainty regarding the impact of future environmental conditions and the success of implemented conservation efforts.

The future scenarios project the influences on viability into the future and consider how those influences would potentially impact the Clear Lake hitch's viability. As under Current Condition, we assessed the subspecies' resiliency, redundancy, and representation under each future scenario. For resiliency, we projected the impact to the subspecies' reproduction, recruitment, water quantity (tributary), and water quality (lake) at the population level and the analysis unit level.

The following six factors affecting the Clear Lake hitch were included in both of the two plausible future scenarios:

1. The loss of spawning habitat due to past watershed modifications that have blocked access to or altered the flow regime of tributaries. The lack of consistent tributary flow will continue due to the effects of past instream gravel mining, deforestation, and grazing practices; existing flood control project infrastructure; fire activity; and water utilization for agricultural and urban uses. Because the rate of urban development has slowed in the last decade, we do not anticipate a significant amount of urban growth into the future. The timeframe for the current Lake County General Plan is 20 years and only projects growth out to 2028; however, we still do not expect growth to increase much after 2028. Although the amount of agricultural development increased substantially leading up to the 21st century, over the last 10 years or so the acreage of fruit, nut, field, seed, and vegetable crops in Lake County only slightly increased.

Therefore, we do not anticipate a substantial increase in the amount of agricultural production into the future (Service 2024, pp. 29, 34). Furthermore, future climate change is projected to further exacerbate the degradation and inaccessibility of tributaries by increasing the incidence of fire activity, flood events, and aridity. Various passage barriers, both physical barriers and lack of flow, will continue to persist in the watershed. And there are no there are no groundwater sustainability plans for low priority basins.

2. The loss of wetland/tule habitat. The current remaining wetland/tule habitat surrounding the lake will persist into the future, primarily due to the implementation of Lake County's Clear Lake Shoreline Ordinance.

3. Continued reductions in lake water quality due to the past loss of wetland/tule habitat surrounding the lake, contamination from past mercury mining along the lake's shore and from pesticide use for agricultural and urban uses, the input of sediment and nutrients from degraded tributaries, and nutrient inputs from surrounding urban and agricultural development. As mentioned above, we do not project agricultural production or urban development to increase substantially into the future. Elevated nutrient and sediment inputs continue to contribute to periodic cyanobacteria blooms, further reducing water quality. Periodic fish kills continue to occur.

4. Nonnative fish species from past introductions are still established within the lakes.

5. Drought incidence and intensity increase due to climate change, reducing tributary flow during the spawning season in some years.

6. The continued implementation of current regulatory mechanisms (*e.g.,* CESA, Lake County's Clear Lake Shoreline Ordinance) and management actions (*e.g.,* Lake County's Aggregate Resources Management Plan, other miscellaneous restoration actions occurring throughout the watershed).

Scenario 1 assesses the viability of the subspecies if the trend and magnitude of threats were to continue at the current trajectory into the future with implemented management efforts being fully successful. Scenario 2 assesses the subspecies' future viability with an increase in the trend and magnitude of threats with implemented management efforts having mixed success. Additional details regarding the scenarios are described in the SSA report (Service 2024, pp. 89–91).

Under Scenario 1, many of the factors that are having an influence on each of the Clear Lake hitch populations continue at current rates, or slightly increase. The effects of climate change, specifically increased aridity, are already occurring throughout the watershed, although the effects of increased aridity are not apparent every year. Future drought conditions are projected to increase in both the number of years drought conditions persist and the intensity of drought. Due to the increased incidence of aridity, and because future climate projections show the timing of precipitation will change, in some years, the number of spawning tributaries available to the Clear Lake hitch over the spawning season will decrease. A slight increase in fire and flooding incidence will increase the amount of erosion occurring in the tributaries, further decreasing lake water quality. As conditions worsen in the tributaries, the hitch will have to increasingly rely on spawning in the lake or in the mouths of streams. Because the Clear Lake hitch is a State-listed species, direct take will continue to be prohibited without a permit. Due to Lake County's Clear Lake Shoreline Ordinance, the amount of existing wetland/tule habitats surrounding the lake will continue to persist. Under Scenario 1, the SGMA has been implemented, and general restoration projects, such as contaminant remediation, tributary function, and barrier removal, continue to be

implemented at a small scale throughout the watershed.

Under Scenario 1, both populations decline in resiliency; the Thurston Lake population is in moderate condition, and the Clear Lake population is in moderate/low condition. Each Clear Lake analysis unit is either unchanged from current condition, or declines. The resiliency for SIGs 1 and 5 remains in low condition. SIG 4 remains in moderate condition, and SIGs 2 and 3 decline from moderate to moderate/low condition. For representation, because both populations of Clear Lake hitch are narrowly distributed and occupy the same ecological niche, environmental and genetic diversity are not expected to change dramatically under Scenario 1. Therefore, representation for the Clear Lake hitch under current conditions is maintained under Scenario 1.

For redundancy, given the narrow range, both populations of the subspecies could be affected simultaneously by large-scale events. However, the Clear Lake hitch uses different types of spawning habitats (tributary, lake, or interface between the two) across its narrow range, which may increase the ability of the subspecies to withstand a catastrophic drought event, which is not expected to change dramatically under Scenario 1. Therefore, redundancy for the Clear Lake hitch under current conditions is maintained under Scenario 1.

Under Scenario 2, some of the factors that are having an influence on each of the Clear Lake hitch populations continue at current rates, while others will increase (Service 2024, pp. 92–94). In this scenario, climate change results in more arid conditions throughout the subspecies' range and impacts from increased fire and flooding increase erosion occurring in the tributaries, further decreasing water quality within the lake. As conditions worsen in the tributaries, the Clear Lake hitch will have to increasingly rely on spawning in the lake or in the mouths of streams. In addition, under this scenario, agricultural production slightly increases in areas currently not prioritized by the SGMA, small-scale restoration projects have been implemented but not all are successful, the Middle Creek Project has not been implemented, and few passage barriers have been removed. Under Scenario 2, Lake County's Clear Lake Shoreline Ordinance will continue to limit tule habitat loss, and the CESA will continue to limit the take of Clear Lake hitch individuals.

The overall resiliency of each population will decline under Scenario 2. The projections result in a moderate condition for the Thurston Lake population and low condition for the Clear Lake population. Within Clear Lake, each SIG declines to or maintains a low condition except for Rodman Slough, which has a moderate/low condition.

Under Scenario 2, due to declines in abundance and recruitment predicted under this future scenario, we anticipate representation will be somewhat reduced from current conditions, and, therefore, the subspecies will be less able to adapt to changing environmental conditions. We also anticipate that redundancy will be somewhat reduced from current conditions due to predicted declines in abundance and recruitment, and, therefore, the subspecies will be more susceptible to a catastrophic event.

We also present uncertainties associated with the future conditions analyses for the Clear Lake hitch. As described above under *Current Condition,* there is uncertainty regarding some of the subspecies' life-history traits, including recruitment, and some of the factors influencing the subspecies' viability that were used in the future condition scenarios. Although there is a current population estimate for the subspecies, this estimate is in its initial stages and additional years of monitoring data are needed to provide a more accurate estimate. Because we do not have an accurate current number to compare to, and therefore cannot project changes in the size of either population, we must qualitatively describe how future influences will impact Clear Lake hitch populations. There is uncertainty in how successful recruitment is in the lower Clear Lake watershed, including within Clear Lake itself. Our analysis assumes reproduction is successful when adults are documented in the tributaries over the spawning season and that some lake spawning is successful. It is possible these assumptions are overestimating how successful reproduction is, resulting in an overestimation of population resiliency.

Lastly, there is uncertainty around the degree of impact from water extraction for agricultural use on the Clear Lake hitch and its habitat. Groundwater pumping can deplete surface water in streams and reduce flow and available water (USGS 2013, entire). Water extractions may be one of the reasons for the reduction in the Clear Lake hitch's population; however, the Clear Lake watershed is complex, and we do not fully understand how surface and ground water interact in most of the watershed because studies have not been completed. We also do not have a full understanding of where water extractions are occurring or how much water is being extracted; however, there are ongoing studies to better understand the magnitude of impacts on the Clear Lake watershed (Santana 2024, pers. comm.). Although we do not fully understand if or how groundwater extraction is having an impact on the Clear Lake hitch, we do know that water extraction in the summer lowers the water level in pool habitat that acts as refugia for native fish in the disconnected streams until they become reconnected by spring rains. It is the loss of this pool habitat that affects the Clear Lake hitch. However, because groundwater extraction is likely affecting water availability for the subspecies, for our analysis, it is a logical assumption that groundwater pumping for agricultural production is likely having a negative impact on the subspecies. We also assumed the highest rates of pumping are occurring where the most agricultural production occurs. Therefore, it is possible we are overestimating the impact from this threat, resulting in an underestimate of current population resiliency.

Additional uncertainty is presented regarding future impacts to the subspecies and its habitat from climate change, the future trajectory of current negative influences to the subspecies (*i.e.,* agricultural production and urban development), the long-term success of current conservation actions, and the implementation and success of future conservation actions. Our overall future condition analysis assumes climate change will exacerbate the current negative influences (*e.g.,* drought) acting on the subspecies; both future scenarios capture the full risk of this influence within the 40-to-50-year timeline. For agricultural production and urban development, we assume future trends will be similar to trends over the last decade, which only showed slight increases. It is possible we underestimated the future trajectory of these influences, which would result in an overestimation of future population resiliency. The number of conservation actions being implemented in the watershed has increased over the past few years; however, we are uncertain about their success over the long term and whether the current trend in implementation will continue into the future. Since the two future condition scenarios consider the breadth of future implementation and success of conservation activities for the Clear Lake hitch, the overall future condition analysis captures the full benefits of this influence on the subspecies.

Determination of the Clear Lake Hitch's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines an ''endangered species'' as a species in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

The Act requires that we determine whether a species meets the definition of an endangered species or a threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating the threats to the Clear Lake hitch and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we have determined that the overall viability of the Clear Lake hitch has declined from historical levels due to the past and ongoing threats of habitat loss, degradation, and modifications (Factor A), predation (Factor C), competition (Factor E), and the effects of climate change (Factor E) .

Currently, the subspecies has two extant populations: the Clear Lake population, which has a moderate resiliency, and the Thurston Lake population, which has a high resiliency. Both populations are able to withstand stochastic environmental variation. Representation and redundancy are similar to historical conditions, with both populations narrowly distributed and occupying the same ecological niche. Because of the historical connectivity within a single, large watershed, Clear Lake provided better habitat conditions for the subspecies. Currently, Thurston Lake does not have the level of threats acting on the subspecies that are affecting the hitch in Clear Lake. Surveys in 2023 of the Clear Lake population show there is an influx of age classes, thus indicating there is reproduction occurring. The diverse demographic makeup of the subspecies' population in Clear Lake provides support that there is redundancy across the Clear Lake hitch's range and bolsters the subspecies' resiliency. Therefore, the Clear Lake hitch is not currently at risk of extinction throughout its range and does not meet the Act's definition of an endangered species.

However, under both future scenarios we see declines in population resiliency in the foreseeable future as a result of factors that will continue to affect the subspecies. Our analysis of the past, current, and future factors influencing viability revealed there are six primary factors affecting the viability of the Clear Lake hitch. These risks to viability are primarily related to habitat changes but also includes others with more direct effect to the subspecies:

1. The loss of spawning habitat due to past watershed modifications that have blocked access to or altered the flow regime of tributary streams.

2. The loss of wetland/tule habitat. The current remaining wetland/tule habitat surrounding the lake will persist into the future, primarily due to the implementation of Lake County's Clear Lake Shoreline Ordinance.

3. Continued reductions in lake water quality due to the past loss of wetland/tule habitat surrounding the lake, contamination from past mercury mining along the lake's shore and from pesticide use for agricultural and urban uses, the input of sediment and nutrients from degraded tributaries, and nutrient inputs from surrounding urban and agricultural development. As mentioned above, we do not project agricultural production or urban development to increase substantially into the future. Elevated nutrient and sediment inputs continue to contribute to periodic cyanobacteria blooms, further reducing water quality. Periodic fish kills continue to occur.

4. Nonnative fish species from past introductions are still established within Clear Lake.

5. Drought incidence and intensity increase due to climate change, reducing tributary flow during the spawning season in some years (Hayhoe *et al.* 2004, pp. 12424–12425, Pierce *et al.* 2013, pp. 848–850).

6. The continued implementation of current regulatory mechanisms (*e.g.,* CESA, Lake County's Clear Lake Shoreline Ordinance), management actions (*e.g.,* Lake County's Aggregate Resources Management Plan, and other miscellaneous restoration actions occurring throughout the watershed) that limits the amount of gravel extract.

Under both future scenarios, Thurston Lake declines to a moderate resiliency and Clear Lake declines to a moderate/low or low resiliency, suggesting the subspecies will be less likely to withstand stochastic environmental variation in the future. Under future Scenario 1, redundancy and representation are mostly maintained but begin to be impacted by the declines in population resiliency. Under future Scenario 2, both redundancy and representation are reduced due to the limited availability of some spawning habitats and the subspecies being less able to adapt to changing environmental conditions. Because of this future reduction in resiliency, redundancy, and representation, the subspecies is likely to become endangered within the foreseeable future throughout its range and meets the Act's definition of a threatened species. Thus, after assessing the best scientific and commercial data available, we conclude that the Clear Lake hitch is not in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson,* 435 F. Supp. 3d 69 (D.D.C. 2020) (*Everson*), vacated the provision of the Final Policy on Interpretation of the Phrase ''Significant Portion of Its Range'' in the Endangered Species Act's Definitions of ''Endangered Species'' and ''Threatened Species'' (hereafter ''Final Policy''; 79 FR 37578, July 1, 2014) that provided if the Services determine that a species is threatened throughout all of its range, the Services will not analyze whether the species is endangered in a significant portion of its range.

Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the ''significance'' question or the ''status'' question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Everson,* we now consider whether the Clear Lake hitch is in danger of extinction in a significant portion of its

range. In undertaking this analysis for the Clear Like hitch, we chose to address the significance question first. We identified Clear Lake and its tributaries as a significant portion of the subspecies' range; this portion is biologically meaningful to the subspecies due to its large geographical size (*i.e.,* it encompasses the greatest proportion of the subspecies' entire range and near 95 percent of the available lake habitat). Additionally, Clear Lake and its tributaries support the majority of the subspecies' entire population. We include the tributaries in this portion because the Clear Lake hitch uses them for spawning, and they are important for the reproduction aspect of the subspecies' lifecycle.

After determining the portion's significance, we evaluated the Clear Lake hitch's status within that portion. Since we found the subspecies meets the Act's definition of threatened across its entire range, we considered the status of the portion to determine if the subspecies within Clear Lake and its tributaries meets the Act's definition of an endangered species. The current resiliency of this population is scored as moderate (see table 2, above). Seasonal surveys conducted in Clear Lake from 2017 to 2023 indicate fluctuations in the populations; the 2023 surveys yielded the highest number (304) of individual hitch captured. The increase could possibly be due to more water available from a rainy year. The 2023 surveys also show there is an influx of age classes, thus indicating there is reproduction occurring across a range of years and climatic conditions. This diverse demographic makeup of the subspecies' population in Clear Lake provides support that there is currently redundancy within the portion and bolsters the subspecies' resiliency. Representation and redundancy in this portion are similar to historical conditions, with the population narrowly distributed and occupying the same ecological niche. The current resiliency is moderate for this portion, and this portion retains sufficient resiliency such that it will be able to withstand stochastic environmental variation in the near term. Therefore, the subspecies is not in danger of extinction within this portion of its range.

Therefore, no portion of the species' range provides a basis for determining that the species is in danger of extinction in a significant portion of its range, and we determine that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior,* 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy, including the definition of ''significant'' that those court decisions held to be invalid.

Determination of Status

Based on the best scientific and commercial data available, we determine that the Clear Lake hitch meets the Act's definition of a threatened species throughout its range. Therefore, we propose to list the Clear Lake hitch as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition as a listed species, planning and implementation of recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, foreign governments, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies, including the Service, and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

The recovery planning process begins with development of a recovery outline made available to the public soon after a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions while a recovery plan is being developed. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) may be established to develop and implement recovery plans. The recovery planning process involves the identification of actions that are necessary to halt and reverse the species' decline by addressing the threats to its survival and recovery. The recovery plan identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (''downlisting'') or removal from protected status (''delisting''), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery outline, draft recovery plan, final recovery plan, and any revisions will be available on our website as they are completed (*https://www.fws.gov/program/endangered-species*), or from our Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (*e.g.,* restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If the Clear Lake hitch is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of California would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Clear Lake hitch. Information on our grant programs that are available to aid species recovery can be found at: *https://www.fws.gov/service/financial-assistance.*

Although the Clear Lake hitch is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery

efforts for this subspecies. Additionally, we invite you to submit any new information on this subspecies whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7 of the Act is titled, ''Interagency Cooperation,'' and it mandates all Federal action agencies to use their existing authorities to further the conservation purposes of the Act and to ensure that their actions are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat. Regulations implementing section 7 are codified at 50 CFR part 402.

Section 7(a)(2) states that each Federal action agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Each Federal agency shall review its action at the earliest possible time to determine whether it may affect listed species or critical habitat. If a determination is made that the action may affect listed species or critical habitat, formal consultation is required (50 CFR 402.14(a)), unless the Service concurs in writing that the action is not likely to adversely affect listed species or critical habitat. At the end of a formal consultation, the Service issues a biological opinion, containing its determination of whether the Federal action is likely to result in jeopardy or adverse modification.

In contrast, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Although the conference procedures are required only when an action is likely to result in jeopardy or adverse modification, action agencies may voluntarily confer with the Service on actions that may affect species proposed for listing or critical habitat proposed to be designated. In the event that the subject species is listed or the relevant critical habitat is designated, a conference opinion may be adopted as a biological opinion and serve as compliance with section 7(a)(2) of the Act.

Examples of discretionary actions for the Clear Lake hitch that may be subject to conference and consultation procedures under section 7 of the Act are management of Federal lands administered by BLM and USFS, as well as actions that require a Federal permit (such as a permit from USACE under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or actions funded by Federal agencies such as the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency. Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation. Federal agencies should coordinate with the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) with any specific questions on section 7 consultation and conference requirements.

Section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must issue protective regulations that are ''necessary and advisable to provide for the conservation of such species'' (these are referred to as ''4(d) rules). Additional measures for the Clear Lake hitch are described below (see Protective Regulations Under Section 4(d) of the Act, below).

We may issue permits to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits for threatened wildlife are codified at 50 CFR 17.32, and general Service permitting regulations are codified at 50 CFR part 13. With regard to threatened wildlife, a permit may be issued: for scientific purposes, for enhancing the propagation or survival of the species, or for take incidental to otherwise lawful activities. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

II. Protective Regulations Under Section 4(d) of the Act

Background

As discussed in Available Conservation Measures, section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must issue protective regulations that are ''necessary and advisable to provide for the conservation of such species'' (these are referred to as ''4(d) rules''). Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened species.

Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. With these two sentences in section 4(d), Congress delegated broad authority to the Secretary to determine what protections would be necessary and advisable to provide for the conservation of threatened species, and even broader authority to put in place any of the section 9 prohibitions, for a given species. Courts have recognized the extent of the Secretary's discretion under section 4(d) to develop rules that are appropriate for the conservation of a species. For example, courts have upheld, as a valid exercise of agency authority, rules developed under section 4(d) that included limited prohibitions against takings (see *Alsea Valley Alliance* v. *Lautenbacher,* 2007 WL 2344927 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service,* 2002 WL 511479 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana* v. *Verity,* 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, ''once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [them] with regard to the permitted activities for those species. [They] may, for example, permit taking, but not importation of such species. [They] may, for example, permit taking, but not importation of such species, or [they] may choose to forbid both taking and importation but allow the transportation of such species'' (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Under our 4(d) authorities, we put in place protections intended to both prevent a threatened species from becoming an endangered species and to promote its recovery. We have two ways to put in place these protections for a

threatened species: (1) we can issue a species-specific 4(d) rule (at 50 CFR 17.40–17.47 or 17.73–17.74), which would contain all of the protective regulations for that species; or (2) we can apply a ''blanket rule'' (for more information, see 89 FR 23919, April 5, 2024), which extends to threatened species without a species-specific rule all of the prohibitions that apply to endangered species under section 9 (with certain exceptions applicable to threatened species).

Both ''blanket rules'' and species-specific 4(d) rules explain what is prohibited for a threatened species, thus making the activity unlawful without a permit or authorization under the Act for the prohibited activity unless otherwise excepted in the 4(d) rule (species-specific 4(d) rules may also include affirmative requirements). Section 4(d) rules are therefore directly related to what actions may require permits in the future. As discussed in Available Conservation Measures, permits may be issued for purposes described in our threatened species permitting regulations at 50 CFR 17.32 and 17.72, including for recovery actions, conservation benefit agreements (previously referred to as candidate conservation agreements with assurances and safe harbor agreements), or habitat conservation plans. We may also except otherwise prohibited activities through a 4(d) rule itself, in which case threatened species permits would not be required for those activities. For example, there are two categories of exceptions that we frequently include in 4(d) rules, and these are for otherwise prohibited acts or forms or amounts of ''take'' that are: (1) unavoidable while conducting beneficial actions for the species, or (2) considered inconsequential (de minimis) to the conservation of the species. For otherwise prohibited take activities that require section 10 permits, programmatic approaches—such as general conservation plans and template habitat conservation plans—may be available as another way for project proponents to comply with take prohibitions or requirements applicable to one or more species while reducing the time that would otherwise be associated with developing individual permit applications. In addition, the Service and project proponents can reduce the need for such permits by developing standardized conservation measures that avoid the risk of ''take.''

The provisions of the Clear Lake hitch's proposed protective regulations under section 4(d) of the Act are one of many tools that we would use to promote the conservation of the Clear Lake hitch. The proposed protective regulations would apply only if and when we make final the listing of the Clear Lake hitch as a threatened species. Nothing in 4(d) rules change in any way the recovery planning provisions of section 4(f) of the Act or the consultation requirements under section 7 of the Act. As mentioned previously in Available Conservation Measures, section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, even before the listing of any species or the designation of its critical habitat is finalized, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. These requirements are the same for a threatened species regardless of what is included in its 4(d) rule.

Whether a threatened species is protected through a ''blanket rule'' or a species- specific 4(d) rule, protective regulations do not alter section 7 obligations, including the criteria for informal or formal consultations or the analytical process used for biological opinions or concurrence letters. Section 7 consultation is required for Federal actions that ''may affect'' a listed species regardless of whether take caused by the activity is prohibited or excepted by a 4(d) rule (the ''blanket rule'' or a species-specific 4(d) rule.

For example, as with an endangered species, if a Federal agency determines that an action is ''not likely to adversely affect'' a threatened species, this will require the Service's written concurrence (50 CFR 402.13(c)). Similarly, if a Federal agency determinates that an action is ''likely to adversely affect'' a threatened species, the action will require formal consultation with the Service and the formulation of a biological opinion (50 CFR 402.14(a)). Because consultation obligations and processes are unaffected by 4(d) rules, we may consider developing tools to streamline future intra-Service and interagency consultations for actions that result in forms of take that are not prohibited by the 4(d) rule (but that still require consultation). These tools may include consultation guidance; streamlined, online consultation processes via the Service's digital project planning tool (Information for Planning and Consultation; *https://ipac.ecosphere.fws.gov/*); template language for biological opinions; or programmatic consultations.

Provisions of the Proposed 4(d) Rule

Exercising the Secretary's authority under section 4(d) of the Act, we have developed a proposed rule that is designed to address the Clear Lake hitch's conservation needs. As discussed above under Summary of Biological Status and Threats, we have concluded that the Clear Lake hitch is likely to become in danger of extinction within the foreseeable future primarily due to habitat loss, degradation, and modification; nonnative species' predation; competition; and the effects of climate change. Section 4(d) requires the Secretary to issue such regulations as she deems necessary and advisable to provide for the conservation of each threatened species and authorizes the Secretary to include among those protective regulations any of the prohibitions that section 9(a)(1) of the Act prescribes for endangered species. We are not required to make a ''necessary and advisable'' determination when we apply or do not apply specific section 9 prohibitions to a threatened species (In re: Polar Bear Endangered Species Act Listing and 4(d) Rule Litigation, 818 F. Supp. 2d 214, 228 (D.D.C. 2011) (citing *Sweet Home Chapter of Cmtys. for a Great Or.* v. *Babbitt,* 1 F.3d 1, 8 (D.C. Cir. 1993), *rev'd on other grounds,* 515 U.S. 687 (1995))). Nevertheless, even though we are not required to make such a determination, we have chosen to be as transparent as possible and explain below why we find that, if finalized, the protections, prohibitions, and exceptions in this proposed rule as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the Clear Lake hitch.

The protective regulations we are proposing for the Clear Lake hitch incorporate prohibitions from the Act's section 9(a)(1) to address the threats to the subspecies. The prohibitions of section 9(a)(1) of the Act, and implementing regulations codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed any of the following acts with regard to any endangered wildlife: (1) import into, or export from, the United States; (2) take (which

includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) within the United States, within the territorial sea of the United States, or on the high seas; (3) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such wildlife that has been taken illegally; (4) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity; or (5) sell or offer for sale in interstate or foreign commerce. This protective regulation includes all of these prohibitions because the Clear Lake hitch is at risk of extinction within the foreseeable future and putting these prohibitions in place would help prevent further declines in the subspecies, preserve the species remaining populations, and decrease synergistic, negative effects from other ongoing or future threats.

In particular, this proposed 4(d) rule would provide for the conservation of the Clear Lake hitch by prohibiting the following activities, unless they fall within specific exceptions or are otherwise authorized or permitted: importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, carrying, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce. Under the Act, ''take'' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulations at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take would help to sustain water quality and water flow within the tributaries and improve reproductive success, prevent further declines preserve or improve the resiliency of the remaining populations, and decrease synergistic, negative effects from other ongoing or future threats. Therefore, we propose to prohibit take of the Clear Lake hitch, except for take resulting from those actions and activities specifically excepted by the 4(d) rule.

Exceptions to the prohibition on take would include all of the general exceptions to the prohibition on take of endangered wildlife, as set forth in 50 CFR 17.21, and additional exceptions, as described below.

Despite these prohibitions regarding threatened species, we may under certain circumstances issue permits to carry out one or more otherwise prohibited activities, including those described above. The regulations that govern permits for threatened wildlife state that the Director may issue a permit authorizing any activity otherwise prohibited with regard to threatened species. These include permits issued for the following purposes: for scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act (50 CFR 17.32). The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

In addition, to further the conservation of the species, any employee or agent of the Service, any other Federal land management agency, the National Marine Fisheries Service, a State conservation agency, or a federally recognized Tribe, who is designated by their agency or Tribe for such purposes, may, when acting in the course of their official duties, take threatened wildlife without a permit if such action is necessary to: (i) Aid a sick, injured, or orphaned specimen; (ii) dispose of a dead specimen; (iii) salvage a dead specimen that may be useful for scientific study; or (iv) remove specimens that constitute a demonstrable but nonimmediate threat to human safety, provided that the taking is done in a humane manner; the taking may involve killing or injuring only if it has not been reasonably possible to eliminate such threat by live capturing and releasing the specimen unharmed, in an appropriate area.

We recognize the special and unique relationship that we have with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist us in implementing all aspects of the Act. In this regard, section 6 of the Act provides that we must cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with us in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, would be able to conduct activities designed to conserve the Clear Lake hitch that may result in otherwise prohibited take without additional authorization.

The proposed 4(d) rule would also provide for the conservation of the species by allowing exceptions that incentivize conservation actions or that, while they may have some minimal level of take of the Clear Lake hitch, are not expected to rise to the level that would have a negative impact (*i.e.,* would have only de minimis impacts) on the subspecies' conservation. The proposed exceptions to these prohibitions include activities associated with the cleanup of illegal cannabis cultivation sites in the Clear Lake watershed, Tribal collection, fish rescues, fuels and fire management activities, habitat management and restoration, and nonnative fish species removal (described below) that are expected to have negligible impacts to the Clear Lake hitch and its habitat.

Cleanup of Illegal Cannabis Cultivation Sites

Illegal cannabis cultivation in California has been an ongoing problem, and illegal grows are known to occur in Lake County within the Clear Lake hitch's range (Lake County News 2023, entire; California Statewide Law Enforcement Association 2020, entire). Although species-specific studies on the impact that illegal cannabis grows have on the Clear Lake hitch are not currently available, these illegal cannabis sites are known to impact fish and their habitats, not only during active operation but also when sites are left abandoned. As described above in the Threats section, many pesticides can be highly toxic and used illegally at cannabis grow sites. Fertilizers are also used at these sites. Growers can add these chemicals to their irrigation systems, causing the chemicals to seep into the surrounding soil and waterways (California Department of Pesticide Regulation 2021, p. 2; USDA 2023, entire). Fertilizers affect the water quality and may increase cyanobacteria blooms and fish kills (Baker 2018, p. 6).Water diversions associated with illegal cannabis cultivation sites, block fish passage, change flow regimes, and cause other secondary effects (Baker 2018, p. 6).

Cleanup efforts to address chemical contamination and water diversion structures from these illegal grow sites will help protect the surrounding ecosystem and discourage other growers from returning to the same sites (USDA 2023, entire). During cleanup efforts, some localized, short-term disturbances to Clear Lake hitch habitat may occur if activities occur within or adjacent to

that habitat. Implementation of these cleanup activities will not appreciably reduce the likelihood of survival and recovery of the Clear Lake hitch and will result in a long-term benefit to the subspecies and surrounding ecosystem. Therefore, we propose to except take incidental to otherwise lawful activities that remove toxicants, other chemicals, and related water diversion infrastructure from illegal cannabis cultivation sites in the Clear Lake watershed.

Tribal Collection

The Clear Lake area is one of the earliest known sites to be occupied by Native Americans, approximately 10,000 years ago (Richerson et al. 2008, p. A259). For their subsistence, the local Pomo Tribes historically relied on the large spawning runs of hitch and other native migrating fish during the spring, drying and storing them to eat throughout the year. Tribes continued to harvest hitch until the mid-1980s, when the spawning runs began to decline (Big Valley Environmental Protection Agency 2013 in CDFW 2014, p. 26). California State regulations allowed capture of Clear Lake hitch on tributaries by hand or dip-net until the subspecies was designated a candidate for State listing under the CESA (CDFW 2014, p. 26).

In recognizing the Tribe's long-standing relationship to the subspecies, we propose to except take caused by collection of Clear Lake hitch by members of federally recognized Tribes for ceremonial use or traditional consumption if the collection is conducted pursuant to a Tribal conservation plan.

Fish Rescues

Clear Lake hitch may become stranded during drought or at other times when there is low water availability. Due to their reliance on connectivity between tributaries and lakes for the reproductive cycle, a reduction of flow in the tributaries during the spawning season can completely eliminate or greatly reduce the likelihood for successful reproduction or recruitment or both. The effects of drought will affect the entire subspecies because of its inherently narrow range and will result in strandings. Several entities aid stranded Clear Lake hitch, including State, Federal, Tribal, local, and private individuals.

Therefore, we propose to except take caused by rescue of individual Clear Lake hitch that are at risk of stranding and eventual death in drying or warming pools, and the subsequent transport and release into a flowing, connected tributary stream or into a larger waterbody (*e.g.,* Clear Lake, Blue Lakes, Tule Lake).

Fuels and Fire Management Activities

In certain areas, the use of fire and wildfire management such as prescribed burns, fuel reduction activities, and maintenance of fuel breaks (not including the use of heavy equipment such as bulldozers, backhoes, or tractors) may assist in protecting and maintaining land adjacent to the aquatic systems used by the Clear Lake hitch.

Establishing and maintaining required minimum vegetation clearance from dwellings or structures to reduce wildland fire risks to human life and property may assist in protecting and maintaining habitat for the Clear Lake hitch by controlling erosion and improving water quality. This process includes activities necessary to maintain the minimum clearance (defensible space) requirement from any occupied dwelling or occupied structure, or to the property line, whichever is nearer, to provide reasonable fire safety and to reduce wildfire risks consistent with the State of California fire codes or local fire codes/ordinances. Therefore, we propose to except take incidental to an otherwise lawful activity caused by fuels and fire management activities (such as prescribed fire) to reduce the risk or severity of catastrophic wildfire, and when such activities will be carried out in accordance with an established and recognized fuels or forest management plan that includes measures to minimize impacts to the Clear Lake hitch or aquatic habitats and will result in conservation benefits to the Clear Lake hitch.

Habitat Management and Restoration

Clear Lake hitch individuals require connectivity to lakes and tributaries throughout their lives. Different life stages depend on different habitat types. Tributaries are used for spawning and successful reproduction. During the spawning season, most adults likely migrate into the connected tributaries; however, some reproductive adults may stay within the lake and spawn along the shore, the mouth of tributaries, or in backwater areas (*e.g.,* Rodman Slough in Clear Lake). Outside of the spawning season, the Clear Lake hitch is primarily found in Clear Lake or Thurston Lake, but can also be found in Tule Lake, the Blue Lakes, and other permanent waterbodies such as reservoirs and ponds. Within the lacustrine habitats, the subspecies can be found in either the littoral zone (nearshore) as juveniles or the limnetic zone (sun-lit, offshore open water) as adults. During extreme drought conditions, the only successful reproduction may be within the lakes.

Nonnative vegetative growth along the lake's shoreline can outcompete the growth of important native wetland plant species, such as tule. Nonnative plant species, such as Himalayan blackberry (*Rubus armeniacus*), growing along the tributaries can become so overgrown that they become passage barriers or they outcompete native species such as willows and cottonwoods. Removal and maintenance of excessive nonnative vegetation may assist the restoration of wetland and riparian habitats throughout the watershed so that these habitats can be used as breeding and rearing habitat for the Clear Lake hitch.

Therefore, we propose to except take incidental to otherwise lawful activity caused by habitat management and restoration efforts that specifically provide for the habitat needs of the Clear Lake hitch and include measures that minimize impacts to the subspecies and its habitat. These efforts must be carried out in accordance with finalized conservation plans or strategies for the Clear Lake hitch that have the approval of appropriate State or Federal agencies. These activities will most likely have some limited short-term impacts but overall will provide for conservation of the subspecies.

Nonnative Fish Species Removal

As noted earlier in this document, 25 different species of nonnative fish have been introduced into Clear Lake for recreational or biological control purposes, and although not all of them have become established, about 20 are still found in the lake today (Thompson et al. 2013, pp. 12–17). All of the piscivorous species in Clear Lake are potential predators of the Clear Lake hitch, and there have been accounts of the subspecies in the digestive tracts of both largemouth bass and channel catfish (Macedo 1994, p. 5; Moyle et al. 1995, pp. 154–155; Moyle et al. 2014, p. 10). Anecdotal reports suggest the Clear Lake hitch may be a main prey-item for largemouth bass. Predation and competition from the nonnative species will continue to affect the Clear Lake hitch at the individual, population, and subspecies level into the future throughout its range, reducing survival, reproduction, and recruitment, which reduces resiliency by decreasing the size of the spawning and overall population.

Nonnative species removal will significantly increase the viability of the Clear Lake hitch. Actions with the primary or secondary purpose of removing nonnative fish species that

compete with, predate upon, or degrade the habitat of the Clear Lake hitch are beneficial to the Clear Lake hitch. Therefore, we propose to exempt take incidental to otherwise lawful activity caused by removal or eradication of nonnative fish species. This exception does not include actions that disturb habitat or involve the use of chemicals.

III. Critical Habitat

Background

Section 4(a)(3) of the Act requires that, to the maximum extent prudent and determinable, we designate a species' critical habitat concurrently with listing the species. Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features:

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (*i.e.,* range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (*e.g.,* migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that each Federal action agency ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of designated critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation also does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Rather, designation requires that, where a landowner requests Federal agency funding or authorization for an action that may affect an area designated as critical habitat, the Federal agency consult with the Service under section 7(a)(2) of the Act. If the action may affect the listed species itself (such as for occupied critical habitat), the Federal agency would have already been required to consult with the Service even absent the designation because of the requirement to ensure that the action is not likely to jeopardize the continued existence of the species. Even if the Service were to conclude after consultation that the proposed activity is likely to result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must implement ''reasonable and prudent alternatives'' to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat).

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 4(b)(2) of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information compiled in the SSA report and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species; the recovery plan for the species; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; other unpublished materials; or experts' opinions or personal knowledge. Habitat is dynamic, and species may move from one area to another over time.

We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) the prohibitions found in the 4(d) rule. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may

still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of the species. Similarly, critical habitat designations made on the basis of the best scientific data available at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome.

Critical Habitat Determinability

Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of ''critical habitat.''

We reviewed the available information pertaining to the biological needs of the subspecies and habitat characteristics where this subspecies is located, but sufficient data to perform the required consideration of economic impacts are lacking at this time.

Therefore, we conclude that the designation of critical habitat for the Clear Lake hitch is not determinable at this time. The Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

Required Determinations

Clarity of the Rule

We are required by E.O.s 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

Regulations adopted pursuant to section 4(a) of the Act are exempt from the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) and do not require an environmental analysis under NEPA. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This includes listing, delisting, and reclassification rules, as well as critical habitat designations and species-specific protective regulations promulgated concurrently with a decision to list or reclassify a species as threatened. The courts have upheld this position (*e.g., Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995) (critical habitat); *Center for Biological Diversity* v. *U.S. Fish and Wildlife Service,* 2005 WL 2000928 (N.D. Cal. Aug. 19, 2005) (concurrent 4(d) rule)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government- to-Government Relations with Native American Tribal Governments; 59 FR 22951, May 4, 1994), E.O. 13175 (Consultation and Coordination with Indian Tribal Governments), the President's memorandum of November 30, 2022 (Uniform Standards for Tribal Consultation; 87 FR 74479, December 5, 2022), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Tribes and Alaska Native Corporations (ANCs) on a government-to-government basis. In accordance with Secretary's Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We contacted all federally recognized Tribes in the range of the Clear Lake hitch during the initiation of our SSA development process. Two of the local Tribes provided technical review of the SSA report. We will continue to work with relevant Tribal entities during the development of a final rule for listing of, and a proposed rule for the designation of critical habitat for, the Clear Lake hitch.

References Cited

A complete list of references cited in this rulemaking is available on the internet at *https://www.regulations.gov* and upon request from the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are members of Fish and Wildlife Service's Species Assessment Team and Sacramento Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Plants, Reporting and recordkeeping requirements, Transportation, Wildlife.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

■ 2. In § 17.11, in paragraph (h), amend the List of Endangered and Threatened Wildlife by adding an entry for ''Hitch, Clear Lake'' in alphabetical order under FISHES to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	* * *
FISHES				

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	*
Hitch, Clear Lake	*Lavinia exilicauda chi*	Wherever found	T	[**Federal Register** citation when published as a final rule]; 50 CFR 17.44(mm).[4d]
*	*	*	*	*

■ 3. Amend § 17.44 by adding paragraph (mm) to read as follows:

§ 17.44 Species-specific rules—fishes.

* * * * *

(mm) Clear Lake hitch (*Lavinia exilicauda chi*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Clear Lake hitch. Except as provided under paragraph (mm)(2) of this section and §§ 17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of a commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *Exceptions from prohibitions.* In regard to this species, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (4) for endangered wildlife.

(iii) Take, as set forth at § 17.31(b).

(iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

(v) Take incidental to an otherwise lawful activity caused by:

(A) Activities that remove toxicants, other chemicals, and related water diversion infrastructure from illegal cannabis cultivation sites in the Clear Lake watershed.

(B) Fuels and fire management activities (such as prescribed fire) to reduce the risk or severity of catastrophic wildfire, and when such activities will be carried out in accordance with an established and recognized fuels or forest management plan that includes measures to minimize impacts to the Clear Lake hitch or aquatic habitats and will result in conservation benefits to the Clear Lake hitch. This exception does not include the use of heavy equipment, such as bulldozers, backhoes, or tractors, for fuels and fire management activities.

(C) Habitat management and restoration efforts that are specifically designed to provide for the conservation of the Clear Lake hitch's habitat needs and include measures that minimize impacts to the Clear Lake hitch and its habitat. These efforts must be carried out in accordance with finalized conservation plans or strategies for the Clear Lake hitch that have the approval of appropriate State or Federal agencies.

(D) Removal or eradication of nonnative fish species, including, but not limited to, carp and goldfish, for the conservation benefit of the Clear Lake hitch. This exception does not include actions that disturb habitat or involve the use of chemicals.

(vi) Purposefully take associated with:

(A) Collection of Clear Lake hitch individuals by members of federally recognized Tribes for ceremonial use or traditional Tribal consumption if the collection is conducted pursuant to a Tribal conservation plan.

(B) Activities associated with rescuing Clear Lake hitch individuals that are at risk of stranding in drying or warming pools and relocating them into connected waterways.

* * * * *

Stephen Guertin,

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. 2024–31756 Filed 1–15–25; 8:45 am]

BILLING CODE 4333–15–P