B

**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**[Docket No. FWS-R8-ES-2022-0166; FF09E21000 FXES1111090FEDR 234]**

**RIN 1018–BG64**

# Endangered and Threatened Wildlife and Plants; California Spotted Owl; Endangered Status for the Coastal-Southern California Distinct Population Segment and Threatened Status with Section 4(d) Rule for the Sierra Nevada Distinct Population Segment

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Proposed rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), propose to list two distinct population segments (DPSs) of the California spotted owl (*Strix occidentalis occidentalis*), a bird species from California and Nevada, 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 California spotted owl. After a review of the best available scientific and commercial information, we find that listing the Coastal-Southern California DPS as endangered is warranted, and that listing the Sierra Nevada DPS as threatened is warranted. Accordingly, we propose to list the Coastal-Southern California DPS as an endangered species under the Act and the Sierra Nevada DPS as a threatened species with a rule issued under section 4(d) of the Act ("4(d) rule"). If we finalize this rule as proposed, it will add these two DPSs to the List of Endangered and Threatened Wildlife and extend the Act's protections to them.

**DATES:** We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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 [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** *Written comments:* 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-2022-0166, 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-2022-0166, 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* under Docket No. FWS-R8-ES-2022-0166.

**FOR FURTHER INFORMATION CONTACT:** Michael Fris, Field Supervisor, 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.

**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 endangered 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 Sierra Nevada DPS of the California spotted owl meets the definition of a threatened species, and the Coastal-Southern California DPS of the California spotted owl meets the definition of an endangered species; therefore, we are proposing to list them 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 the listing of the Sierra Nevada DPS of the California spotted owl as a threatened species with a rule under section 4(d) of the Act and the Coastal-Southern California DPS of the California spotted owl as an endangered species under 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 both the Sierra Nevada population and the coastal-southern California population of the California spotted owl are discrete and significant under our DPS policy and are, therefore, listable entities under the Act. The Sierra Nevada DPS is found in the Sierra Nevada Mountain Ranges and foothills in California and western Nevada. The Coastal-Southern California DPS is found in the Coast, Transverse, and Peninsular Ranges of California. These two DPSs together represent the entirety of the California spotted owl's range.

The Sierra Nevada DPS of the California spotted owl is currently being impacted by high-severity fire, tree mortality, drought, and barred owls. This DPS still has resiliency throughout its range, and some areas remain in stable condition; however, we expect the magnitude of impacts from high-severity fire, tree mortality, drought, climate change, and other threats to increase into the future. Because the Sierra Nevada DPS is likely to become in danger of extinction within the foreseeable future, we propose to list it as threatened.

The Coastal-Southern California DPS has low resiliency, redundancy, and representation. The entirety of the range of this DPS is at extremely high risk of fire, and available habitat is fragmented. All areas of the Coastal-Southern California DPS are currently declining, and the DPS faces additional threats from tree mortality and drought. Because the Coastal-Southern California DPS is currently in danger of extinction, we propose to list it as endangered.

**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 species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, 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 populations of this species;

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

(e) Past and ongoing conservation measures for the species, its habitat, or both.

(2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status of this species.

(5) Information on regulations that may be necessary and advisable to provide for the conservation of the Sierra Nevada DPS of the California spotted owl and that we can consider in developing a 4(d) rule for the species. In particular, information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule or whether we should consider any additional exceptions from the prohibitions in the 4(d) rule.

(6) Whether we should include in our 4(d) rule for the Sierra Nevada DPS the provision at 50 CFR 17.7 for raptors in captivity.

(7) Which areas may be appropriate as critical habitat for the species and why areas should or should not be proposed for designation as critical habitat in the future, including whether there are threats to the species from human activity that would be expected to increase due to the designation and whether that increase in threat would outweigh the benefit of designation such that the designation of critical habitat may not be prudent.

(8) Specific information on:

(a) The amount and distribution of habitat for the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl which should be considered for proposed critical habitat;

(b) What may constitute the physical or biological features essential to the conservation of the species within the geographical range currently occupied by the species;

(c) Where these features are currently found;

(d) Whether any of these features may require special management considerations or protection;

(e) What areas are currently occupied and contain features essential to the conservation of the species that should be included in the designation and why; and

(f) What unoccupied areas may be essential for the conservation of the species and why.

Please include sufficient information, 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 (16 U.S.C. 1533(b)(1)(A)) 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*.

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that the Coastal-Southern California DPS is threatened instead of endangered, or that the Sierra Nevada DPS is endangered instead of threatened, or we may conclude that neither DPS warrants 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 for the Sierra Nevada DPS if we conclude it is appropriate in light of comments and new information received. For example, we may expand the incidental-take prohibitions or the exceptions to those prohibitions in the 4(d) rule for the

Sierra Nevada DPS to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the DPS. Conversely, we may establish additional exceptions to the incidental-take prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the DPS.

*Public Hearing*

Section 4(b)(5) of the Act (16 U.S.C. 1533(b)(5)) 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).

**List of Abbreviations and Acronyms**

We use many abbreviations and acronyms in this proposed rule. For the convenience of the reader, we define some of them here:

ac = acres

BLM = Bureau of Land Management

CAL FIRE = California Department of Forestry and Fire Protection

CDWR = California Department of Water Resources

CI = confidence interval

cm = centimeters

dbh = diameter at breast height

DPS = distinct population segment

ft = feet

HCP = habitat conservation plan

ha = hectares

in = inches

km = kilometers

IPCC = Intergovernmental Panel on Climate Change

m = meters

mi = miles

MOU = memorandum of understanding

NPS = National Park Service

PAC = protected activity center

RCP = representative concentration pathway

SPI = Sierra Pacific Industries

SSA = species status assessment

USFS = U.S. Forest Service

**Previous Federal Actions**

For a detailed history of prior petitions, listing actions, and litigation, please see the 12-month finding published on May 24, 2006 (71 FR 29886). Subsequent to that finding, we were petitioned twice to list the California spotted owl as endangered or threatened and to designate its critical habitat under the Act (16 U.S.C. 1531 et seq.). The first petition was submitted in December 2014, by the Wild Nature Institute and John Muir Project of Earth Island Institute, and the second in August 2015, by Sierra Forest Legacy and Defenders of Wildlife. On September 18, 2015, we published a 90-day finding that the petitions presented substantial scientific or commercial information indicating that listing may be warranted for the California spotted owl (80 FR 56423). On

November 8, 2019, we published a 12-month finding that listing the California spotted owl was not warranted at that time (84 FR 60371).

In August 2020, Sierra Forest Legacy, Defenders of Wildlife, and the Center for Biological Diversity filed a complaint challenging our 12-month not-warranted finding. By stipulated settlement agreement approved by the court on November 30, 2021, we agreed to submit to the *Federal Register* a new 12-month finding for the California spotted owl on or before February 15, 2023 (*Sierra Forest Legacy, et al.* v. *U.S. Fish and Wildlife Service, et al*., No. 5:20-cv-05800-BLF (N.D. Cal.)). This document serves as our 12-month finding and completes our obligations under that settlement agreement.

**Peer Review**

In 2022, a species status assessment (SSA) team prepared an SSA report for the California spotted owl. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the 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 of listing actions under the Act, we solicited independent scientific review of the information contained in the California spotted owl SSA report. The Service sent the SSA report to four independent peer reviewers and received one response. 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*

We received comments from one peer reviewer on the draft SSA report. We reviewed all comments we received from the peer reviewer for substantive issues and new information regarding the information contained in the SSA report. The peer reviewer generally provided additional references, clarifications, and suggestions, including further definitions of some of the terms used. We updated the SSA report based on the peer reviewer's comments, including changing the approach to our scoring system for the current and future habitat analyses, clarifying specific points where appropriate, and adding additional details and suggested references where needed. Peer reviewer comments are addressed in the following summary and were incorporated into the SSA report as appropriate.

*Comment 1:* The peer reviewer stated that there was not enough discussion in the SSA report about how habitat factors have been observed to impact owls, particularly in regards to the existing studies analyzing demographic trends of California spotted owls. Further, the peer reviewer stated that the SSA report should discuss the methodology used in the demography studies.

*Our response:* We acknowledge that habitat factors and demographic factors are interrelated, and that understanding the relation between those two issues is crucial. We discuss how habitat factors influence demographic factors, and vice versa, in sections 3.1 and 3.2 of the SSA report (Service 2022, pp. 14–24). We have also incorporated all available information on how the two are related. Additionally, not all of the demographic studies discuss the relationship between vital rates or population trends and habitat factors, but we incorporated the information into the SSA report where available.

Regarding the methodology used in the demography studies, we added a paragraph to the SSA report that discusses different methodologies used in the different types of population studies available in the literature (Service 2022, p. 24). We will provide a list of all literature cited should any readers wish to review those studies in

more detail, and we will provide any studies not readily available on *https://www.regulations.gov*.

*Comment 2:* The peer reviewer further questioned the assumption in the SSA report that high-quality habitat is equivalent to population stability, or vice versa.

*Our response:* While we recognize that data are limited, the best available scientific and commercial data, including all available information on habitat use and species needs for the California spotted owl, concluded that the relationship between high-quality habitat and population stability is sufficiently certain to rely upon for our analysis of species viability.

*Comment 3:* While recognizing that some protected activity center (PAC) information is out of date, the peer reviewer suggested adding the amount of PAC area to the analysis units in section 5.3 of the SSA report.

*Our response:* The detailed analysis unit descriptions describe the current condition of each unit. Because PAC information does not provide insight on the current condition of each analysis unit, it would not be appropriate to include in section 5.3 of the SSA report (a PAC is a designation made by the USFS to protect the best available 121 ha (300 ac) of habitat in as compact of a unit as possible around a nest tree). We do, however, incorporate information from PACs throughout the SSA report and this proposed rule to understand the impact, breadth, and distribution of threats across the landscape.

*Comment 4:* The peer reviewer questioned whether we should use the same criteria to analyze conditions in the Sierra Nevada and in coastal/southern California.

*Our response:* In order to present a standardized comparison across all analysis units, we used the same scoring criteria for the Sierra Nevada and coastal/southern California. However, we recognize that California spotted owls may use different-sized trees in the coastal-southern California population than in the Sierra Nevada population.

We presented a separate analysis acknowledging this, and we included the difference in tree sizes found in the two geographic areas (Service 2022, tables 9, 13, and 18).

## I. Proposed Listing Determination

### Background

A thorough review of the taxonomy, life history, and ecology of the California spotted owl (*Strix occidentalis occidentalis*) is presented in the SSA report (version 2.0; Service 2022, pp. 8–14).

California spotted owls are medium-sized brown owls measuring 46.6–48.3 cm (18.3–19.0 in) with a mottled appearance, round face, large pale brown facial disks, dark brown eyes, and a yellowish green bill (Verner et al. 1992, p. 55; Gutiérrez et al. 2020, "Appearance" section). Females are generally slightly larger than males (Verner et al. 1992, p. 55).

The American Ornithological Society (formerly the American Ornithologists' Union (AOU)) currently recognizes three distinct subspecies of spotted owls: northern spotted owl (*Strix occidentalis caurina*), California spotted owl, and Mexican spotted owl (*Strix occidentalis lucida*) (AOU 1957). Given similarities between the subspecies of spotted owls, the SSA report and this proposed rule use available relevant literature for both the northern spotted owl and the Mexican spotted owl as necessary and appropriate and clearly identify when we refer to those entities. The term "spotted owl" is used when talking about *Strix occidentalis* as a whole. Additionally, under the Act, the term "species" includes any subspecies of fish or wildlife or plants. For the purposes of this proposed rule, we in general use "species" to refer to the California spotted owl rather than "subspecies."

There is some overlap in range between northern spotted owls and the California spotted owl, and interbreeding between the two subspecies occasionally occurs (Haig et al. 2004, p. 690; Barrowclough et al. 2011, pp. 581, 583–586; Miller et al. 2017, pp.

6871, 6875–6877; Hanna et al. 2018, pp. 3947–3948, 3950–3951). California spotted owls have the lowest genetic diversity among the subspecies compared to northern and Mexican spotted owls, suggesting that the California spotted owl is of more recent origin than the other spotted owl subspecies or that populations of the California spotted owl are much smaller than the northern and Mexican spotted owl populations (Barrowclough et al. 1999, pp. 919, 927; Haig et al. 2004, p. 683). Within the California spotted owl, genetic differences between individuals found in the Sierra Nevada and individuals found in mountain ranges throughout southern California suggest limited interbreeding between these two areas (Barrowclough et al. 2005, pp. 1113–1114; Hanna et al. 2018, pp. 3947–3948, 3950). However, these genetic studies are limited by sample size and sampling locations. We are only aware of one study that includes California spotted owls from coastal California; this study shows gene flow between geographically adjacent spotted owl samples, with some evidence of asymmetrical gene flow between California spotted owls in Carmel, California (coastal California), and the Sierra Nevada (Barrowclough et al. 2005, p. 1114).

California spotted owls are distributed across habitat in California and Nevada including the Sierra Nevada, coastal California, and southern California. The California spotted owl has also been documented in the Sierra San Pedro Martir mountains in Baja California Norte, Mexico, with a few scattered records of the spotted owl in Baja California between 1887 and 1972 (Grinnell 1928, p. 242; Wilbur 1987, p. 170). However, many researchers now question whether the species ever actually occurred in Baja California (Erickson in litt. 2022; Unitt in litt. 2022). There are only a few accounts of the species, with none of those accounts mentioning breeding or evidence of breeding pairs. Therefore, we consider the California spotted owl to be only a rare visitor of Mexico, and do not consider Baja California as its own population.

California spotted owls are continuously distributed throughout the forests of the western side of the Sierra Nevada from Shasta County south to the Tehachapi Pass in Kern County (Gutiérrez et al. 2017, pp. 13–14). They are sparsely distributed on the eastern side of the Sierra Nevada into western Nevada (GBBO 2012, p. Spp-47-4). Outside of the Sierra Nevada, the species' range is not contiguous. Along the California coast and into southern California, the species is found in the Coast, Transverse, and Peninsular mountain ranges from Monterey County in the north to San Diego County in the south (Gutiérrez et al. 2020, "Distribution" section). However, there is a large break in the species' range around San Luis Obispo County, where the species is not known to occur. The Tehachapi Pass between the Sierra Nevada to the east and the Transverse Range to the west represents a gap between California spotted owls in the Sierra Nevada and California spotted owls in coastal and southern California (Verner et al. 1992, p. 4). California spotted owls are absent from the Santa Cruz Mountains (part of the Coast Range) in California, where suitable habitat appears to be present (Gutiérrez et al. 2017, p. 240).

California spotted owls are currently found throughout their known historical range, although there is evidence of a decrease in abundance in parts of the range including both the Sierra Nevada and southern California (Franklin et al. 2004, pp. 23–42; Tempel et al. 2014b, pp. 90–94; Conner et al. 2016, pp. 7–18; Hanna et al. 2018, pp. 3947–3949; Tempel et al. 2022, p. 18). The majority of California spotted owls are found in mid-elevation, mixed-conifer forest on the west slope of the Sierra Nevada (Gutiérrez et al. 2017, p. xviii).

California spotted owls are long-lived (approximately 16–23 years) with high adult survival and low reproductive output (Seamans and Gutiérrez 2007, p. 57; Gutiérrez et al. 2020, "Demography and Populations" section). Pairs exhibit high territory fidelity (Gutiérrez et al. 2020, "Sounds and Vocal Behavior" and "Behavior" sections).

Territories—the area actively defended by a breeding pair—can overlap with neighboring pairs and are smaller than home ranges (Gutiérrez et al. 2017, pp. xvi, 294). Estimates of territory size have varied from 203 ha (502 ac) to 813 ha (2,009 ac), with higher estimates in the northern Sierra Nevada and lower estimates in southern California (Bingham and Noon 1997, p. 136; Blakesley et al. 2005, p. 1556; Seamans and Gutiérrez 2007b, p. 568; Tempel et al. 2014b, p. 2091). Higher quality territories measured in adult survival, territory colonization, and territory extinction, tend to have a greater proportion of higher canopy cover (Tempel et al. 2014b, p. 2089; Gutiérrez et al. 2017, pp. 271–273). Home ranges, or areas used by a pair to meet requirements for survival and reproduction, are about 400–1,200 hectares (ha) (1,000–3,000 acres (ac)) in size (Gutiérrez et al. 2017, p. xviii). Home ranges are typically larger in the northern portion of the range (>1,000 ha (2,470 ac)) and smaller in the southern portion of the range (<1,000 ha (2,470 ac)) due to differences in selected prey species (Gutiérrez et al. 2017, p. xviii).

Breeding season begins in mid-February, and the juvenile dependency period can last through mid-September; nesting generally starts earlier at lower elevations (Gutiérrez et al. 2020, "Breeding" section). During the breeding season, California spotted owls tend to spend the majority of their time at activity centers of around 121 ha (299 ac) (Verner et al. 1992, p. 87; Berigan et al. 2012, p. 299). Activity centers are the areas where California spotted owls they nest, roost, and forage (Verner et al. 1992, p. 87; Gutiérrez et al. 2017, pp. 270–271). Spotted owls typically have only one nest per breeding season, and they rarely re-nest if the first nests fails (Gutiérrez et al. 2020, "Breeding" section). Females typically lay 1–3 eggs, with survival of offspring into adulthood highest when two young fledge in comparison to singletons and triplets (Peery and Gutiérrez 2013, p. 132; Gutiérrez et al. 2020, "Demography and Populations" section). Although difficult to estimate due to dispersal, juvenile survival in California spotted owls is low (Blakesley et al. 2001, p. 667; LaHaye et al. 2004, p. 1056).

Spotted owls always disperse from their natal areas in the year they hatch. Natal dispersal occurs during the fall, after juveniles have reached adult weight and parental care stops (Gutiérrez et al. 2020, "Breeding" section). Average juvenile dispersal in southern California is 9.7–11.3 km (6–7 mi), and ranges from 3.2–37.0 km (2–23 mi) (LaHaye et al. 2001, p. 691). Larger dispersal distances, up to 177 km (110 mi), have been documented in both northern and Mexican subspecies (Gutiérrez and Carey 1985, p. 60; Ganey et al. 1998, p. 206; Hollenbeck et al. 2018, p. 533). Adult California spotted owls typically do not shift territories or undergo breeding dispersal from an established territory (Blakesley et al. 2006, p. 76; Zimmerman et al. 2007, p. 963; Gutiérrez et al. 2011, p. 592); however, some breeding dispersal occurs in adults or pairs that have been unsuccessful in mating or if habitat is altered (Blakesley et al. 2006, p. 71).

Breeding only occurs once a pair is formed and settled into a territory (Gutiérrez et al. 2017, p. 15). Pairs can breed in consecutive years, but in certain conditions may postpone reproduction until temporarily poor environmental conditions improve (Stearns 1976, pp. 4, 15–26; Franklin et al. 2000, p. 539; Gutiérrez et al. 2017, p. xvi). The number of young fledged annually per territorial California spotted owl female in several areas within the Sierra Nevada ranged from 0.478–0.988 (Blakesley et al. 2010, pp. 1, 18).

In general, California spotted owls nest in areas of mature, multistoried forests with complex structure, larger trees, multi-layered high canopy cover, and large amounts of coarse woody debris, while areas with higher heterogeneity of forest types and the edges between them are important for foraging (Gutiérrez et al. 2017, p. xvii). In the Sierra Nevada, a majority of California spotted owls occur within mid-elevation ponderosa pine (*Pinus ponderosa*), mixed-conifer, white fir (*Abies concolor*), and mixed-evergreen forest types, with few occurring in the lower elevation oak woodlands of the western foothills (Gutiérrez et al. 2017, p. 109). In coastal and southern California,

California spotted owls are found in riparian/hardwood forests and woodlands, live oak/big cone fir forests, and redwood/California laurel forests (Gutiérrez et al. 2017, p. xxvi). In southern California, vegetation types differ relative to the Sierra Nevada, and what is considered a large tree in southern California may not be comparable to what is considered a large tree in the Sierra Nevada. However, California spotted owls in southern California still select for territories containing larger trees (LaHaye et al. 1997, pp. 42, 47) and predominantly closed canopy cover (Smith et al. 2002, pp. 137, 142, 144).

California spotted owls can use a variety of habitat types for nesting. At higher elevations, the species primarily uses conifers, and as elevations decrease, they increasingly use hardwoods (Gutiérrez et al. 2020, "Habitat" section). Important components of nesting habitat include high canopy cover, larger trees, and high habitat heterogeneity. For nest trees, California spotted owls use a subset of larger trees or snags, with the average nest tree measuring 124 cm (49 in) diameter at breast height (dbh) and 31 m (103 ft) tall in the Sierra Nevada (Gutiérrez et al. 2017, p. 50). In southern California, California spotted owls use cavity, broken-top, and platform nests with different characteristics (LaHaye et al. 1997, pp. 42, 47; Tanner 2022, pers. comm.). In southern California, California spotted owl use of platform or old raptor nests is more common; thus, owls with these types of nests were observed using smaller trees than used in other nest types (LaHaye et al. 1997, p. 45).Within their nesting territory, California spotted owls select for nest sites farther away from the forest edge (Phillips et al. 2010, p. 312). Overall, California spotted owl occupancy, colonization, adult survival, and reproductive success are all positively associated with an increasing amount of structurally complex habitat on the landscape (Franklin et al. 2000, p. 578; Blakesley et al. 2005, p. 1562; Tempel et al. 2014a, pp. 2103–2104).

California spotted owls can also use a variety of habitats to forage. California spotted owls primarily prey upon a variety of small to medium-sized mammals, including, but not limited to, flying squirrels, woodrats, and pocket gophers, as well as birds, lizards, and insects (Gutiérrez et al. 2017, p. 28). In the Sierra Nevada, above approximately 1,200 m (3,937 ft) in coniferous forests, California spotted owls most commonly consume Humboldt's flying squirrels (*Glaucomys oregonensis*) (Laymon 1988, pp. 130–154; Verner et al. 1992, pp. 4, 65–69; Munton et al. 2002, pp. 99, 101–104). Preferred habitat conditions of Humboldt's flying squirrels include cool, moist, mature forest with abundant standing and down snags where they can forage on mostly fungi and lichens (Cassola 2016, p. 3). In lower elevation oak woodlands and riparian-deciduous forests in the Sierra Nevada and southern California, California spotted owls select for woodrats (*Neotoma* spp.) (Verner et al. 1992, pp. 4, 65, 68–69; Smith et al. 1999, pp. 22, 24–28; Munton et al. 2002, pp. 99, 101–104). Due to this elevational gradient in prey distribution, California spotted owls select foraging sites characteristic of flying squirrel habitats at higher elevations and woodrat habitats at lower elevations (Kramer et al. 2021b, pp. 12–14).Some individuals have smaller home ranges where woodrats are the primary prey source, presumably because woodrats have a higher caloric gain per successful foraging event and are found in higher densities than northern flying squirrels (Zabel et al. 1995, pp. 433, 435–438). There is some evidence that California spotted owl diet may shift following wildfires. In national parks in the Sierra Nevada that have implemented longstanding fire management efforts (i.e., prescribed fire and managed wildfire), the California spotted owl diet contains a higher proportion of woodrats and pocket gophers relative to flying squirrels (Hobart et al. 2021, pp. 254, 256).

In regard to foraging habitat, important components include the presence of larger trees, high canopy cover, and coarse woody debris. California spotted owls tend to forage

in larger trees, likely due to the canopy cover provided by larger trees and the important resources such as shelter and food that larger trees provide for prey species (Laymon 1988, pp. 47, 71, 77, 100; Verner et al. 1992, pp. 9–10, 60, 88; Moen and Gutiérrez 1997, pp. 1281, 1284). However, California spotted owls use medium-size trees (defined by the authors as >25 cm dbh (9 in)) for foraging while avoiding areas dominated by small trees (<25 cm dbh (9 in)) (Kramer et al. 2021a, pp. 4, 6). Coarse woody debris is also an important habitat feature for California spotted owls because it provides food, shelter, and protection for prey species, especially woodrats (Waters and Zabel 1995, pp. 861–862; Pyare and Longland 2002, pp. 1016–1017; Innes et al. 2007, pp. 1523, 1526; Kelt et al. 2013, p. 1208). Heterogeneous forests, such as those found on private lands, may provide more habitat for California spotted owls than was previously understood (Atuo et al. 2019, p. 295), as some privately owned study areas have higher numbers of occupied sites than adjacent USFS study areas (Roberts et al. 2017, p. 113).

California spotted owl roosting habitat is very similar to nesting habitat. Specific components of roosting habitat include multi-layered high canopy cover and presence of large trees. It is believed that such forests provide young California spotted owls with protection from predators and from high temperatures. California spotted owls have a low heat tolerance in comparison to other bird species, beginning to show heat stress at 30–34 degrees Celsius (°C) (86–93 degrees Fahrenheit (°F)). The cooler microclimates that multi-layered high canopy cover provides are important for both juveniles and adults during warm summers (Weathers 1981, pp. 358–359; Barrows 1981, pp. 303–305; Weathers et al. 2001, pp. 678–679). Presence of large trees is also important for California spotted owl roosting, as individuals tend to roost in large trees, likely due to the canopy cover provided by large trees and the resources they provide for prey species (Laymon 1988, pp. 47, 71, 77, 100; Verner et al. 1992, pp. 9–10, 60, 88; Moen and Gutiérrez 1997, pp. 1281–1284).

Within the SSA report and this proposed rule, we define a population as a group of interbreeding California spotted owls that are more likely to breed among that group than outside of that group. We use information from genetic studies and habitat features to identify two California spotted owl populations: one in the Sierra Nevada, and another in coastal and southern California (hereafter referred to as the coastal-southern California population).

In the western Sierra Nevada, habitat is relatively continuous, without significant gaps in distribution (Gutiérrez et al. 2017, p. xviii); however, in the eastern Sierra Nevada, habitat is more discontinuous with disjunct patches (Dilts 2022, pp. 5–9). Despite this fragmentation, California spotted owls still have substantial gene flow within the Sierra Nevada. However, there is limited gene flow to coastal or southern California, and large-scale fragmentation of suitable habitat divides the Sierra Nevada from this other population (Barrowclough et al. 2005, pp. 1114–1116). We are not aware of specific information about individual California spotted owls moving between these two population areas.

In coastal and southern California, the California spotted owl population consists of subpopulations distributed among discrete mountain ranges, resulting in habitat "islands" surrounded by unsuitable habitat (Verner et al. 1992, p. 187). Areas between these habitat islands are typically lowland desert scrub and chaparral that is unsuitable for California spotted owls, or substantially modified by human-induced development and fragmentation (Verner et al. 1992, p. 187). Some of the subpopulations are separated by relatively narrow gaps, such as the gap between the San Gabriel and San Bernardino Mountains, while other gaps are more significant, such as the gap between the Northern and Southern Santa Lucia Mountains. California spotted owls in coastal and southern California are less well-studied than those in the Sierra Nevada, but there is a notable lack of documented California spotted owl movement between the coastal and southern

subpopulations, and we are not aware of any dispersal between them. This population is also described in the literature as being a presumed metapopulation (Verner et al. 1992, pp. 187–206; LaHaye et al. 1994, entire; Gutiérrez et al. 2017, p. 241) despite the documented lack of connectivity, even though dispersal among populations is a defining characteristic of a metapopulation (see Hanski and Gilpin 1991 for more on metapopulation theory). However, spatial structure of a metapopulation within and among subpopulations is critical for metapopulation functioning, and available evidence does not document successful dispersal between the San Bernardino, San Gabriel, and San Jacinto Mountains, which are adjacent mountain ranges, indicating that if mixing does occur it is very rare (LaHaye et al. 2001, entire; LaHaye et al. 2004, entire; Gutiérrez et al. 2017, pp. 242, 250). Further, not all subpopulations within the metapopulation have equal likelihood of "blinking out" or being rescued/recolonized by other subpopulations, which are important components of metapopulation theory (Gutiérrez et al. 2017, pp. 241–242, 250). Within the coastal-southern California population, the subpopulation inhabiting the San Bernardino and San Gabriel mountains is the largest subpopulation and is the subject of most ecological studies. The persistence of this subpopulation has been identified as important for persistence of the coastal-southern California population (Verner et al. 1992, pp. 197–206)

To conduct a more focused analysis of how different portions of each of the populations' ranges contribute to that population's overall resiliency, we further divided the Sierra Nevada and southern California populations into analysis units (see figure 1, below). We chose analysis units roughly based on public land management boundaries because of varying demographic data and management strategies across the range. Dividing the population up into analysis units based on land management boundaries allows a better assessment of the varying conditions across the range. We identified a total of 15 analysis units: Lassen, Plumas, Tahoe, Eldorado, Humboldt-Toiyabe,

Stanislaus, Yosemite, Sierra, Sequoia-Kings Canyon, Sequoia, Inyo, Las Padres, Las Padres-Angeles, San Bernardino, and Cleveland.


FIGURE 1—POPULATIONS AND ANALYSIS UNITS OF THE CALIFORNIA SPOTTED OWL (CSO).

**Distinct Population Segment Evaluation**

Under the Act, the term "species" includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature (16 U.S.C. 1532(16)). To guide the implementation of the DPS provisions of the Act, we and the National Marine Fisheries Service (National Oceanic and Atmospheric Administration—Fisheries), published the Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS Policy) in the *Federal Register* on February 7, 1996 (61 FR 4722). Under our DPS Policy, we use two elements to assess whether a population segment under consideration for listing may be recognized as a DPS: (1) The population segment's discreteness from the remainder of the species to which it belongs, and (2) the significance of the population segment to the species to which it belongs. If we determine that a population segment being considered for listing is a DPS, then the population segment's conservation status is evaluated based on the five listing factors established by the Act to determine if listing it as either endangered or threatened is warranted.

As discussed above in **Previous Federal Actions**, we were petitioned to list the California spotted owl subspecies throughout its range. In response to the petitions, we divided the species into two populations and our analysis covers the full range of the species. Under the Act, we have the authority to consider for listing any species, subspecies, or, for vertebrates, any distinct populations segment of these taxa if there is sufficient information to indicate that such action may be warranted. Therefore, we considered whether the two populations of the California spotted owl (the Sierra Nevada portion of the California spotted owl's range, and the coastal and southern California portions of the California spotted owl's range) meet the DPS criteria under the Act. These two populations comprise the entirety of the California spotted owl's range (and thus the

entirety of the petitioned entity), and we have determined that it is appropriate to analyze them individually under our DPS policy.

*Discreteness*

Under our DPS Policy, a population segment of a vertebrate taxon may be considered discrete if it satisfies either of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

We conclude the two segments satisfy the "markedly separate" condition. The Sierra Nevada part of the range is separated from the coastal and southern California parts of the range by large-scale fragmentation of suitable habitat, with the Tehachapi Pass in Kern County identified as the dividing line between these areas (Verner et al. 1992, p. 4; Barrowclough et al. 2005, pp. 1114–1116). The distance between suitable habitat in the closest parts of the Sierra Nevada and the Transverse Range of southern California is only 40 km (25 mi). Although this distance is near the known average dispersal of juvenile California spotted owls, we are not aware of specific information about individual California spotted owls moving between the Sierra Nevada and California spotted owl habitat in coastal and southern California (Service 2022, p. 18).

As discussed above in **Background**, there are few genetic studies on the California spotted owl. However, existing analyses provide evidence that gene flow between the two parts of the range is limited and may have been restricted to historical asymmetrical gene flow from areas in the central California coast to the Sierra Nevada (Barrowclough et al. 2005, p. 1113), although the study acknowledges that more data are

needed to inform this conclusion. Our DPS policy notes that we do not consider it appropriate to require absolute reproductive isolation as a prerequisite to recognizing a distinct population segment. As the policy states, this would be an impracticably stringent standard, and one that would not be satisfied even by some recognized species that are known to sustain a low frequency of interbreeding with related species.

Therefore, because the two populations are markedly separated from each other, we have determined that both the Sierra Nevada and the coastal and southern California parts of the range both individually meet the condition for discreteness under our DPS Policy.

*Significance*

Under our DPS Policy, once we have determined that a population segment is discrete, we consider its biological and ecological significance to the larger taxon to which it belongs. This consideration may include, but is not limited to: (1) Evidence of the persistence of the discrete population segment in an ecological setting that is unusual or unique for the taxon, (2) evidence that loss of the population segment would result in a significant gap in the range of the taxon, (3) evidence that the population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range, or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

For the California spotted owl, we first considered evidence that loss of a population segment would result in a significant gap in the range of the taxon. As discussed above, the southwestern and northeastern parts of the range are separated by approximately 40 km (25 mi). The loss of the coastal and southern California parts of the range would result in the loss of the entire southwestern part of the species' range and decrease species redundancy and ecological and genetic representation, thus decreasing

the species' ability to withstand demographic and environmental stochasticity. The loss of the Sierra Nevada range would result in the loss of 70 percent of the species' range, also reducing the species' ability to withstand demographic and environmental stochasticity. Therefore, the loss of either part of the range would result in a significant gap in the range of the California spotted owl.

We then considered evidence whether either of the discrete population segments occur in an ecological setting that is unusual or unique for the taxon. In the Sierra Nevada, a majority of California spotted owls occur within mid-elevation mixed-conifer and mixed-evergreen forest types, with few occurring in the lower elevation oak woodlands of the western foothills (Gutiérrez et al. 2017, p. 109). As described above, in coastal and southern California, California spotted owls are found in riparian/hardwood forests and woodlands, live oak/big cone fir forests, and redwood/California laurel forests, more so than the mixed-conifer communities (Gutiérrez et al. 2017, p. xxvi). Use of these other communities is specific and unique to owls in these areas. What is considered a large tree in southern California may not be comparable to what is considered a large tree in the Sierra Nevada. California spotted owls use a subset of larger trees or snags as their nest trees, with the average nest tree measuring 124 cm (49 in) dbh and 31 m (103 ft) tall in the Sierra Nevada (Gutiérrez et al. 2017, p. 50). In southern California, use of platform or old raptor nests is more common; thus, owls with these types of nests were observed using trees as small as 33 cm (13 in) dbh (Tanner 2022, pers. comm.) with mean values of 75.0 cm (29.5 in) dbh (LaHaye et al. 1997, p. 45). Therefore, we conclude that, for the two populations of California spotted owls, each persists in a unique ecological setting for the species.

The evidence that a significant gap in the range of the taxon would result from the loss of either discrete population segment meets the significance criterion of the DPS Policy. Additionally, there is evidence that the coastal and southern California and the

Sierra Nevada parts of the range have persisted in a unique ecological setting for the species. Therefore, under the Service's DPS Policy, we find that the Sierra Nevada and the coastal and southern California parts of the California spotted owl's range are significant to the taxon as a whole.

*Distinct Population Segment Conclusion*

Our DPS Policy directs us to evaluate the significance of a discrete population in the context of its biological and ecological significance to the remainder of the species to which it belongs. Based on an analysis of the best available scientific and commercial data, we conclude that both parts of the California spotted owl's range are significant, because loss of either part would result in a significant gap in the range of the taxon, and because the population segments represent evidence that both parts of the range have persisted in a unique ecological setting for the species. Therefore, we conclude that both the Sierra Nevada and the coastal and southern California parts of the California spotted owl's range are both discrete and significant under our DPS Policy and are, therefore, uniquely listable entities under the Act.

Based on our DPS Policy (61 FR 4722; February 7, 1996), if a population segment of a vertebrate species is both discrete and significant relative to the taxon as a whole (i.e., it is a distinct population segment), its evaluation for endangered or threatened status will be based on the Act's definition of those terms and a review of the factors enumerated in section 4(a) of the Act. Having found that both parts of the California spotted owl's range meet the definition of a distinct population segment, we evaluate the status of both the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl to determine whether either meets the definition of an endangered or threatened species under the Act.

**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. In 2019, jointly with the National Marine Fisheries Service, the Service issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and the criteria for designating listed species' critical habitat (84 FR 45020; August 27, 2019). On the same day, the Service also issued final regulations that, for species listed as threatened species after September 26, 2019, eliminated the Service's general protective regulations automatically applying to threatened species the prohibitions that section 9 of the Act applies to endangered species (84 FR 44753; August 27, 2019).

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 now and in the foreseeable future.

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. The term "foreseeable future" extends only so far into the future as we can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define the foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

*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 California spotted owl 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 species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' 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 a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report (Service 2022, entire); the full SSA report can be found at Docket No. FWS-R8-ES-2022-0166 on *https://www.regulations.gov*.

**Summary of Biological Status and Threats**

In this discussion, we review the biological condition of the California spotted owl and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

We note that the California spotted owl SSA report discusses California spotted owls at the individual, population, and species level. The SSA does not make any analysis or conclusions with regard to policy decisions, such as DPS findings, and does not include mention of the two populations of the subspecies as DPSs. Instead, the SSA report provides the biological information that our decisionmakers can then use to inform those policy decisions. This proposed rule and its supporting record contain the policy decisions and rationale. Throughout this **Summary of Biological Status and Threats** discussion, we discuss the coastal-southern California population of California spotted owl, which we identify as the Coastal-Southern California DPS, and the Sierra Nevada population of California spotted owl, which we identify as the Sierra Nevada DPS.

*California Spotted Owl Needs*

Individual Needs

In this section, we assess the best available information to identify the specific habitat components needed to support individual fitness at all life stages for California spotted owls. Individual owls must have adequate nesting, foraging, and roosting habitat to be successful. For the purpose of the SSA report and this proposed rule, the components of nesting, foraging, and roosting habitat that we considered most significant include canopy cover, larger trees, and habitat heterogeneity. Habitat heterogeneity is important to California spotted owls as it provides protection from predators and extreme weather conditions, variable microclimates, and habitat for different prey species.

We acknowledge that these habitat components are not all-inclusive and there may be other components of nesting, foraging, and roosting habitat that are not being considered (such as prey). We also acknowledge that a history of fire suppression in the western United States, including throughout the range of both the Sierra Nevada DPS and the Coastal-Southern California DPS, has caused many ecological changes that are not fully understood (Mallek et al. 2013, p. 2). However, we chose to focus on habitat

components for which there are available spatial data across the range of the species. Further, prey is indirectly considered in our analysis since the primary California spotted owl prey species also select for high canopy cover and coarse woody debris (Waters and Zabel 1995, p. 858), which are considered here as components of habitat heterogeneity. Populations of California spotted owls require the same habitat components as individuals but at larger scales.

Multi-layered, or complex, high canopy cover is considered an important resource for spotted owls because it provides cool shaded microclimates, camouflage and cover for protection from predators and extreme weather conditions, and habitat for prey species (Forsman 1975, pp. 4, 90, 105; Barrows 1981, p. 302; Forsman et al. 1984, p. 5). High canopy cover from tall trees is associated with higher probability of successful prey capture by California spotted owls (Zulla et al. 2022, p. 8) and is an important predictor for California spotted owl nesting habitat (North et al. 2017, pp. 166, 172–175). Multi-layered high canopy cover around the nest tree and in territories is an important factor associated with California spotted owl reproductive success (Hunsaker et al. 2002, pp. 693–699; Blakesley et al. 2005, pp. 1554, 1558–1562). Areas with canopy cover greater than 70 percent are considered optimal for California spotted owl nest sites and occupancy sharply declines when canopy cover is less than 40 percent (Blakesley et al. 2005, p. 1559; Seamans 2005, pp. iii, 90, 100; Seamans and Gutiérrez 2007b, pp. 566, 568; Tempel et al. 2014a, pp. 2089, 2091, 2101; Tempel et al. 2016, pp. 747, 759). Even in southern California where the habitat is naturally more fragmented with less canopy cover available, California spotted owls still select for areas with higher canopy cover relative to what is available (Smith et al. 2002, pp. 142–143). Further, California spotted owls in Yosemite National Park had territory centers with average values of 40 percent canopy cover in burned forests (Schofield et al. 2020, pp. 4–5).

The presence of large trees, defined as trees that are greater than 61 cm (24 in) dbh (Seamans and Gutiérrez 2007b, pp. 566, 571–574; Tempel et al. 2014b, p. 2094; Jones et al. 2018, p. 344), is important for California spotted owl foraging, roosting, and nesting. California spotted owls tend to forage and roost in large trees, likely due to the canopy cover provided by large trees and the important resources such as shelter and food that large trees provide for prey species (Laymon 1988, pp. 47, 71, 77, 100; Verner et al. 1992, pp. 9–10, 60, 88; Moen and Gutiérrez 1997, pp. 1281, 1284). The presence of tall (>48 m (157 ft)) trees, and the canopy cover they provide, is the best predictor for California spotted owl occupancy, and areas with a high density of large trees are considered high-quality habitat (Blakesley et al. 2005, pp. 1554, 1558–1562; North et al. 2017, pp. 166, 171–176). California spotted owls use a subset of large trees or snags as their nest trees (LaHaye et al. 1997, pp. 42, 47; Blakesley et al. 2005, pp. 1554, 1558–1562; Gutiérrez et al. 2017, p. 50), and the nest tree itself is critical for California spotted owl reproductive success because it provides the space and structure needed for nests, along with protection from predators and inclement weather. California spotted owls do not build their own nests but rely on larger trees that provide multi-layered high canopy cover with open cavities (created as a result of fallen branches, woodpeckers, etc.), broken tops, platforms, and old raptor nests (Gutiérrez et al. 2020, "Habitat" and "Breeding" sections). The nest tree chosen within a territory is typically one of the oldest and largest live or dead trees within the nesting territory with many defects like cracks, disease scars, or decaying wood (Verner et al. 1992, pp. 6, 60, 71; North et al. 2000, p. 797).

The preferential use of mature forests with high canopy cover and large trees is well-known for California spotted owls (Gutiérrez et al. 2017, p. iii). However, there have been several recent studies showing the importance of other habitat types, habitat edges, and habitat heterogeneity (Atuo et al. 2019; Hobart et al. 2019; Kramer et al.

2021b; Zulla et al. 2022; Wilkinson et al., in prep.). California spotted owl occupancy, colonization, adult survival, and reproductive success are all positively associated with the proportion of structurally complex forests (Franklin et al. 2000, p. 539; Blakesley et al. 2005, p. 1562; Tempel et al. 2014b, p. 2089; Tempel et al. 2016, p. 747). The biological and physical components that create habitat heterogeneity and complex structure are areas of multi-layered high canopy cover, large trees, coarse woody debris, understory and mid-story vegetation, patches of burned habitat, riparian habitat, large diameter standing dead trees (snags), and some open areas within a California spotted owl's home range.

Coarse woody debris (fallen dead trees and the remains of large branches on the ground) is an important habitat feature for California spotted owls because it provides food, shelter, and protection for California spotted owl prey species, especially woodrats (Waters and Zabel 1995, pp. 861–862; Pyare and Longland 2002, pp. 1016–1017; Innes et al. 2007, pp. 1523, 1526; Kelt et al. 2013, p. 1208). Coarse woody debris in areas of multi-layered high canopy cover is conducive for fungal growth, a food source for many California spotted owl prey species (Verner et al. 1992, pp. 71–72; Pyare and Longland 2002, pp. 1016–1017). Rates of prey capture by California spotted owls are observed to be higher in taller multilayered forests, in areas with higher vegetation heterogeneity, and near forest-chapparal edges (Wilkinson et al. in prep., p. 2). There are a variety of habitats within a heterogeneous landscape that California spotted owls use and which may provide specific resources. The size of a California spotted owl's home range increases as the heterogeneity, or number of different vegetation patches, increase (Williams et al. 2011, p. 333); the hypothesis is that there may be an optimal point of habitat heterogeneity for California spotted owls beyond which territory quality declines (Williams et al. 2011, p. 333).

Population Needs

Populations of California spotted owls must have adequate amounts of nesting, foraging, and roosting habitat containing the habitat components described above in sufficient amounts and the appropriate configuration on the landscape to support a stable or increasing growth rate. They also need connectivity between territories and home ranges. Populations meeting these requirements are better able to withstand stochastic events. In many instances, however, data are insufficient or completely lacking regarding a population's size and growth rate. In the absence of such data, we examine other characteristics that may serve as surrogate indicators of general population health and, subsequently, resiliency. Essentially, an assessment of the availability of a species' identified needs (suitable habitat, food, breeding sites) may allow us to make assumptions about the potential resiliency of any given population. However, unless there is a documented positive correlation between the availability of species' needs and a population's known demographic condition, the uncertainty regarding such assumptions must be made clear.

In the SSA report, we describe the demographic factors that are considered important for California spotted owls, including natal dispersal, survival, fecundity, occupancy, and population growth. We describe the importance of each demographic factor to California spotted owl persistence and how the individual needs influence these factors.

There is little available information about dispersal and dispersal habitat between the defined California spotted owl populations and analysis units within the SSA report and this proposed rule. Dispersal habitat is described for northern spotted owl as 50 percent of the forest matrix outside of activity centers in stands with an average of 28 cm (11 in) dbh and 40 percent canopy closure (Thomas et al. 1990, p. 15). This contrasts with dispersal for Mexican spotted owls, which may move across large areas of unforested habitat to access suitable habitat on different mountain ranges (Gutiérrez et al.

1995, p. 5; Gutiérrez et al. 2017, p. 242). It is unknown how far California spotted owls will disperse across unsuitable habitat to find a new territory, but adult northern spotted owls have been found to occasionally move long distances if forced out of a territory (Forsman in litt. 2018, p. 22).

For dispersal to be successful, many of the individual needs must be present within the areas to which California spotted owls disperse. Canopy cover, large trees, and coarse woody debris all must be available in sufficient amounts and the appropriate configuration on the landscape (habitat heterogeneity) for juveniles or sub-adults to successfully settle into a territory to begin breeding.

Survival for California spotted owls is closely linked to population growth and is important for maintaining population resiliency (Seamans and Gutiérrez 2007a, p. 57; Blakesley et al. 2010, p. 27). Adult California spotted owls have high annual survival rates ranging from 0.796–0.814 in different study areas within analysis units in southern California (LaHaye et al. 2004, p. 1056; Franklin et al. 2004, p. 22), and 0.811–0.891 in study areas within analysis units in the Sierra Nevada (Blakesley et al. 2001, p. 671; Franklin et al. 2004, p. 22; Blakesley et al. 2010, p. 10; Tempel et al. 2014a, p. 92). In comparison, juvenile survival is difficult to estimate due to dispersal, and has been found to be low, ranging from 0.087–0.333 in study areas within analysis units in the Sierra Nevada (Blakesley et al. 2001, p. 671; Tempel et al. 2014a, p. 92), and 0.368 for southern California (LaHaye et al. 2004, p. 1056). For northern spotted owl, juveniles tend to have high mortality during the dispersal phase (Miller 1989, pp. 41–44; Forsman et al. 2002, p. 18).

All the individual needs discussed above influence survival. For example, survival is related to the amount of forest dominated by medium to large trees, high canopy cover, and habitat complexity (Blakesley et al. 2005, p. 1554; Tempel et al. 2014b, pp. 2089,

2098; McGinn et al. 2022, p. 9). In northern spotted owls, habitat heterogeneity is correlated with higher survival rates (Franklin et al. 2000, p. 539).

Fecundity is defined as the ability to produce offspring and is measured by the number of viable female offspring that an individual can produce over a specific time period. Annual reproductive output, measured by presence or absence of offspring in a nest, for female California spotted owls in a demographic study in the Sierra Nevada was found to range from 0.478–0.988 (Blakesley et al. 2010, p. 1). Reproduction throughout all the demographic studies has ranged from no reproduction within a study area to nearly all birds reproducing in a study area in a particular year (Franklin et al. 2004, pp. 32–33; Seamans and Gutiérrez 2007a, p. 65; Blakesley et al. 2010, p. 17; MacKenzie et al. 2012, p. 597; Tempel et al. 2014a, p. 91; Stoelting et al. 2015, p. 46). Fecundity, measured as female young produced per female annually, has been found to range from 0.284–0.409 in the Sierra Nevada and to be 0.362 in southern California (Franklin et al. 2004, pp. 11, 23).

Many of the individual needs discussed above influence fecundity. Reproductive output decreases as non-forest habitat increases within the area around the nest, and nest success increases as the presence of large remnant trees within the nest stand increases (Blakesley et al. 2005, p. 1554). Reproduction is positively correlated to the foliage volume above the nest tree (North et al. 2000, p. 797), although habitat heterogeneity is also important for reproduction (Franklin et al. 2000, p. 539; Tempel et al. 2014b, p. 2089; McGinn et al. 2022, p. 9) and foraging (Zulla et al. 2022, pp. 7–8). Annual variation in weather also plays a role in reproductive success (North et al. 2000, p. 797; Seamans and Gutiérrez 2007a, p. 57; MacKenzie et al. 2012, p. 597; Stoelting et al. 2015, p. 46). For example, California spotted owls experienced increased fecundity when a dry breeding season followed a previously wet year (LaHaye et al. 2004, pp. 1056, 1062). Although survival of breeding California spotted owls is an important factor that is

closely connected to population growth, reproductive output may be more influential to population growth because it varies more than adult survival (Blakesley et al. 2001, p. 667; Seamans and Gutiérrez 2007a, p. 57).

In the SSA report and this proposed rule, we define California spotted owl occupancy as the stable (not transient) presence of at least one adult within a territory. California spotted owls select and defend territories in which they spend most of their life. California spotted owl pairs will only reproduce once they have established an occupied territory. The measure of occupancy has been found to be strongly correlated with regional abundance of California spotted owls and can provide reliable inferences on population trends (Tempel and Gutiérrez 2013, pp. 1093–1093).

Many of the individual needs discussed above need to be present in order for California spotted owls to occupy a territory. Occupancy is generally higher and more consistent with an increasing proportion of the territory containing large trees and high canopy cover (Blakesley et al. 2005, p. 1554; Seamans and Gutiérrez 2007b, p. 572; Roberts et al. 2011, p. 610; Tempel et al. 2014b, p. 2089; Gutiérrez et al. 2017, p. vxii). As the proportion of forest types that are not used for nesting (smaller, similar-aged young trees) increases, occupancy tends to decrease (Blakesley et al. 2005, pp. 1554, 1560).

In the SSA report and this proposed rule, we define California spotted owl population growth as the change in the number of individuals within a particular study area, which correspond to our analysis units. Population growth is determined by the demographic factors of survival, fecundity, and occupancy, with fecundity likely the most influential because it is more variable (Blakesley et al. 2001, p. 667; Seamans and Gutiérrez 2007a, p. 57; Seamans and Gutiérrez 2007b, p. 566; Blakesley et al. 2010, p. 27; Tempel and Gutiérrez 2013, pp. 1093–1094; Gutiérrez et al. 2017, p. 99). Population growth is variable throughout study areas in the Sierra Nevada DPS where we have

available information, with documented declines ranging from -50 percent to -31 percent in some study areas and a population increase of 25 percent in another (Tempel et al. 2014a, pp. 86, 90–92; Conner et al. 2016, p. 15). The only available demographic data for the Coastal-Southern California DPS is from the San Bernardino National Forest. A population decline of -9 percent was observed from 1987–1998, with more recent occupancy analyses showing further declines in population size (LaHaye et al. 2004, pp. 1056, 1064; Tempel et al. 2022, p. 20, table 5). All individual needs described above need to be present for positive California spotted owl population growth.

Species Needs

At the species level, we assess the redundancy and representation of the entire California spotted owl's range to better understand the viability of the species. For the California spotted owl, we evaluate redundancy by considering the number of resilient populations distributed across the species' range. Having resilient populations distributed across the range increases the species' ability to withstand catastrophic events.

For this species, we evaluate representation by considering the distribution of populations across their various ecological settings and whether those populations are able to maintain adequate amounts of genetic diversity. Having a variety of ecological settings that the species can occupy and a breadth of genetic diversity increases the species' ability to withstand and adapt to long-term environmental changes.

*Threats*

Following are summary evaluations of eight threats analyzed in the SSA report for the California spotted owl: wildfire (Factor A), tree mortality (Factor A), drought (Factor A), climate change (Factor A), fuels reduction and forest management (Factor A), competition and hybridization with barred owls (*Strix varia*) (Factor E), rodenticides (Factor E), and development (Factor A). We also evaluate existing regulatory mechanisms (Factor D) and ongoing conservation measures.

In the SSA report, we also considered four additional threats: Overutilization due to recreational, educational, and scientific use (Factor B); disease (Factor C); predation (Factor C); and recreation (Factor E). We concluded that, as indicated by the best available scientific and commercial information, these threats are currently having little to no impact on the California spotted owl and thus the overall effect of these threats now and into the future is expected to be minimal. Therefore, we will not present summary analyses of those threats in this document, but we considered them in the current and future condition assessments in the SSA report, and we will consider them in our determination of the species' status. For full descriptions of all threats and how they impact the species, please see the SSA report (Service 2022, pp. 25–68).

For the purposes of this assessment, we consider the foreseeable future to be the amount of time on which we can reasonably determine a likely threat's anticipated trajectory and the anticipated response of the species to those threats. For this proposed rule, we consider the foreseeable future to be 40–50 years. This time period represents our best professional judgment of future conditions related to climate change for California, the California spotted owl's generation time, and the regeneration time of medium to large trees.

Wildfire

Fire is a natural part of California spotted owl habitat (Verner et al. 1992, pp. 247–248) and is necessary for maintaining heterogenous forests and overall habitat heterogeneity. Wildfire and associated tree mortality can be beneficial or detrimental for the California spotted owl depending on scale and severity. Fires with predominantly low to moderate severity burn patterns, with small patches of high-severity fire scattered throughout the fire perimeter, can increase habitat heterogeneity, ultimately result in higher prey densities, increase amounts of forest edge for California spotted owl foraging, and provide for unburned refugia within the fire perimeter that have higher tree survival

and more vegetative cover during the immediate postfire years (Roberts et al. 2011, p. 610; Lee et al. 2012, p. 792; Bond et al. 2013, pp. 114, 122; Eyes et al. 2017, p. 384; Blomdahl et al. 2019, pp. 1046, 1048, 1049). There is also evidence to suggest that more pyrodiverse (spatial or temporal variability in fire effects; Jones and Tingley 2021, p. 1) landscapes support greater habitat heterogeneity, which may promote greater biodiversity (Steel et al. 2021, pp. 7–8; Stephens et al. 2021, p. 5). For example, in areas where woodrats are the primary prey species, a juxtaposition of mature forests and open canopy patches promotes higher prey diversity and abundance, and northern spotted owls preferentially select for these areas (Zabel et al. 1995, p. 433; Ward and Noon 1998, p. 79; Franklin et al. 2000, p. 539; Zabel et al. 2003, p. 1027).

Although burned areas can reduce the amount of canopy cover available, California spotted owls forage on the edge of and within areas that have been burned at a range of severities (Bond et al. 2009, p. 1116; Bond et al. 2016, p. 1290; Eyes et al. 2017, p. 375) although typically avoiding larger areas of high-severity fire (Jones et al. 2016a, p. 304; Eyes et al. 2017, p. 383). Thus, many researchers advocate for the use of ecologically beneficial fire to help sustain California spotted owl habitat and report that low to moderate severity fire minimizes the effects of future high-severity wildfire (Stephens et al. 2019, pp. 395–396; Stephens et al. 2020, entire; Stephens et al. 2021, p. 5; Taylor et al. 2022, p. 4).

In contrast, large-scale, high-severity fires have a detrimental effect on both the California spotted owl and its habitat. Large-scale high-severity fire (often referred to as a megafire) is generally defined as over 10,000 ha (24,711 ac) of area burned with 75–100 percent canopy mortality (Jones et al. 2016a, p. 300; Linley et al. 2022, pp. 6, 8). Megafires can degrade or destroy California spotted owl habitat, completely incinerating large trees and canopy cover (Eyes 2014, p. ii; Roberts et al. 2015, pp. 112–115; Jones et al. 2016a, pp. 300–305). Habitat suitability for northern spotted owls decreased postfire

and depended on fire severity (higher fire severity resulted in greater declines of habitat suitability) (Wan et al. 2020, p. 7); thus, megafires have a greater potential to alter the availability of suitable habitat.

The loss of habitat from large-scale, high-severity fires also results in direct impacts to California spotted owl individuals and populations. As megafires alter the number of large trees (including nest trees), multi-layered high canopy cover, habitat heterogeneity, and patch size, California spotted owl dispersal, fecundity, and occupancy are subsequently reduced. It has been observed that large patches of high-severity fire significantly reduce colonization (dispersal), occupancy, and habitat use across the California spotted owl's range (Eyes 2014, p. 42; Tempel et al. 2014b, p. 2089; Jones et al. 2016a, pp. 300, 303–305; Eyes et al. 2017, pp. 381, 384; Jones et al. 2019, p. 26; Jones et al. 2020, entire; Schofield et al. 2020, pp. 5–6; Jones et al. 2021a, p. 5; Tempel et al. 2022, p. 13) and for other subspecies (Rockweit et al. 2017, entire; Lesmeister et al. 2019, p. 13; Duchac et al. 2021, p. 12). Fires may cause direct mortality to eggs and juveniles during the nesting season, and fast-moving fires also have the potential to cause direct mortality to adult California spotted owl individuals (Jones et al. 2016a, p. 305). No data are available on how many California spotted owls are killed annually by direct impacts of large-scale, high-severity fire. Although most birds are able to move to escape direct morality from fires, smoke from fires can impact birds by damaging their lungs (Verstappen and Dorrestein 2005, p. 139). While many species have existed with frequent fire over evolutionary time, megafires and extreme smoke events are novel influences that may act as an additional selective pressure on certain species (Nimmo et al. 2021, p. 5689). There is limited research on the effects of wildfire smoke on wildlife in general, but there is clear evidence that smoke can have both acute and chronic health impacts on a variety of taxa, which may ultimately affect demographic rates (Sanderfoot et al. 2021, p. 13).

As discussed above, high-severity fire has negative effects on individual California spotted owls and their habitat, ranging from reduced occupancy to direct mortality of individuals. However, several publications conclude that spotted owls will continue to use areas burned at high-severity and, therefore, there are no negative effects of high-severity fire for California spotted owls (Lee and Bond 2015, entire; Hanson et al. 2018, entire; Hanson et al. 2021, entire; Lee 2018, entire). We have reviewed these publications and acknowledge this disagreement in the literature. However, our review of all the best available science, including those sources that conclude no negative effects, has led us to agree with the vast majority of science, which concludes that overall spotted owls avoid large patches of high-severity fire and that high-severity fire is increasing throughout California and the western United States. For more analysis on the conflicting results of these studies and our analysis, please see the SSA report (Service 2022, pp. 27–28).

Current conditions in the California spotted owl's range may contribute to ongoing fire risk, and depending on the portion of the range and the land manager, fire management activities may vary. Decades of fire suppression have led to overall higher canopy cover from small and medium trees, higher dead biomass density, and more surface fuels in forests of the western United States (Verner et al. 1992, pp. 247–248; Agee and Skinner 2005, p. 83). The historical fire return interval for the Sierra Nevada was around 11–16 years, but fire suppression over the last 100 years has led to a change in fire behavior of larger, more severe fires in recent years (Safford and Stevens 2017, pp. v–vi). The multi-layered high canopy cover and biomass provide important habitat for California spotted owls but also tend to increase the vulnerability of forests to high-severity fire (Verner et al. 1992, pp. 251–258; Agee and Skinner 2005, p. 83) in present day fire-suppressed forests. The higher fuel loads, particularly large, dead wood (like snags and logs), tend to burn at higher severity as densities increase (Lydersen et al.

2019, p. 7). In a recent megafire, dead biomass directly contributed to the fire effects observed, as areas with high amounts of dead biomass pre-fire burned at high severity (Stephens et al. 2022, p. 8).

On top of the higher fuel loads, extended droughts and longer wildfire seasons have led to larger and more severe fires in the California spotted owl's range and throughout western North America (Miller and Safford 2012, p. 41; Mallek et al. 2013, p. 1; Nigro and Molinari 2019, p. 20; Parks and Abatzoglou 2020, p. 4; Safford et al. 2022, p. 12). In 2020 and 2021, more than 1 million ha (2.4 million ac) burned in California, resulting in more area burned over these 2 years than in the past 7 years of all California fires combined (Safford et al. 2022, p. 5). An increase in high-severity fire changes how fire interacts with important habitat features for California spotted owls. For example, fire often killed, but left standing, trees that would subsequently serve as locations for California spotted owl nests. However, large patches of high-severity fire burn hotter and can end up entirely consuming the features important to California spotted owls. Between the years of 2000 and 2014, 7 percent of suitable California spotted owl nesting habitat (a total of 85,046 ha (210,153 ac) out of 1,166,560 ha (2,882,633 ac)) was burned either partially at moderate severity (typically 25–50 percent tree basal area mortality) or entirely at high severity (typically >75 percent tree basal area mortality), causing ≥50 percent tree basal area mortality and reducing canopy cover to <25 percent (Stephens et al. 2016, pp. 1, 9).

The size and severity of a fire determines how much it will impact California spotted owls at the population level. If a high-severity fire occurs in a large enough area, it can eliminate entire territories or home ranges of California spotted owls, displacing individuals that may or may not establish a new territory (Jones et al. 2016a, pp. 300–305). Site occupancy by California spotted owls after wildfire appears to be a function of the amount of suitable habitat remaining after the fire (Gutiérrez et al. 2017, p. xxiii). If

habitat becomes unsuitable, it takes decades for large trees to reestablish on the landscape. Based on fire activity and anticipated trends over the next 75 years, the cumulative amount of nesting habitat burned at ≥ 50 percent tree basal area mortality will exceed the total existing habitat in the Sierra Nevada (Stephens et al. 2016, pp. 1, 12). In other words, the loss of suitable California spotted owl habitat would exceed the rate of new forest growing post-fire (Stephens et al. 2016, pp. 11–13). Thus, future habitat persistence for California spotted owls is concerning given that high-severity fire appears to be increasing across all lands (both public and private) occupied by California spotted owls and throughout the western United States (Parks and Abatzoglou 2020, pp. 4–5). When private lands are considered separately, the odds of high severity fire occurring on industrially managed forests and adjacent lands were 1.8 and 1.4 times higher, raising some concern over California spotted owl persistence on private lands (Levine et al. 2022, p. 4).

In the Sierra Nevada, the proportion of high severity fire throughout the California spotted owl's range has dramatically increased in recent years. The proportion of high-severity fire in California montane forests in 2020 was on average 43–76 percent higher than the combined average between 1984 and 2008, and was three to six times higher than the estimates of pre-Euroamerican settlement (Safford et al. 2022, p. 17). Between 1984–2019, 1,084,171 ha (2,679,044 ac; 55.7 percent) burned throughout the California spotted owl range in the Sierra Nevada with 317,605 ha (784,820 ac; 46.6 percent) burned at high severity (Keane in litt. 2022, p. 3). In contrast, between 2020 and 2021, 862,625 ha (2,131,593 ac; 44.3 percent) burned throughout the California spotted owl's range with almost 363,812 ha (899,000 ac; 53.4 percent) of that at high severity (Keane in litt. 2022, p. 3). This comparison illustrates how megafires in 2020 and 2021 burned more habitat at high severity in 2 years than fires over the past three and a half decades. In addition, between 1984 and 2021, 50 percent of California spotted owl PAC

acres have been impacted by wildfire, with 56 percent of that total burned in 2020 and 2021. Further, of the 56 percent that burned between 2020 and 2021, 65 percent burned at high severity (Keane in litt. 2022, p. 5). Because California spotted owls are displaced from areas where the entire PAC or majority of the PAC has burned at high severity, it is unlikely the species will continue to persist in these areas until the habitat can recover, which can take decades.

We conducted a fire severity analysis within the entire California spotted owl's range; details of the methodology used in this analysis are available in the SSA report (Service 2022, pp. 29–30). Of the California spotted owl's range, approximately 47 percent burned between 1984 and 2021, with 15 percent at high severity. Most of the area burned at high severity occurred in 2020 and 2021, with 2 percent and 4 percent, respectively (Service 2022, table 3). Additionally, based on an existing dataset from the California Department of Forestry and Fire Protection of the potential threat of future wildfire in California, the majority of the California spotted owl's range occurs within the very high wildfire threat category (Service 2022, figure 8). Much of the coastal-southern California population of the California spotted owl falls within the extreme fire risk. This dataset contains fire information through 2014, and so does not consider how the recent fires from 2014 to 2021 affect future fire threat. Overall, we expect that the pattern of both area burned and wildfire severity will continue or increase into the future due to the effects of climate change.

Some regulatory mechanisms and conservation measures can reduce the potential severity or scale of wildfires. Wildfire fuel reduction treatments, such as prescribed fire and mechanical thinning, can reduce the amount or degree of spotted owl habitat loss from a high-severity fire, and a balanced approach to fuel reduction treatments may ensure suitable California spotted owl habitat is maintained (Jones et al. 2016a, p. 305; Service 2017, pp. 24–25; Chiono et al. 2017, p. 1; Jones et al. 2021a, entire). The 2004

USFS Sierra Nevada Forest Plan Amendment has a goal of actively restoring fire-adapted ecosystems by reducing unnaturally dense conditions, and there are also measures in place in the framework to avoid disturbance within California spotted owl PACs to the greatest extent possible (USFS 2004, pp. 34–35). Fuel reduction treatments are actively taking place on USFS land, but special considerations, including the timing of treatments to avoid the breeding season and the methods that are used, are evaluated to avoid impacts to owls within PACs. In 2017 and in 2020, an MOU was signed by Sierra Pacific Industries, California Department of Forestry and Fire Protection, National Fish and Wildlife Foundation, and the USFS to coordinate on certain actions that may contribute to forest fuel reductions and California spotted owl conservation. The purpose of the MOU is to try to minimize the threat of large-scale, high-severity fire while still providing quality habitat for California spotted owls. However, large-scale, high-severity fire cannot be completely addressed by regulatory mechanisms. Fuel reduction treatments may not prevent catastrophic damage in an extreme fire event; however, when fire is a part of the fuel reduction treatment, future fire severity can be reduced and more fire treatments should be included to achieve fuels reduction goals, including areas surrounding spotted owl nests and riparian corridors (North et al. 2021, pp. 527, 529; Taylor et al. 2022, p. 4).

High-severity fire is likely to continue to be a threat into the future for California spotted owls. Although some individuals could be harmed or killed by large fires, the primary impact of this threat is habitat-based. These habitat changes also affect demographic parameters: following high severity fires, colonization declines and territory extinction increases, leading to overall declines in occupancy (Tempel et al. 2022, pp. 13–16). Overall, large-scale, high-severity fire is currently and will likely continue to be a threat throughout the range of the California spotted owl, including for both the Sierra Nevada and the coastal-southern California populations.

Tree Mortality

Widespread increases in tree mortality have been occurring in California due to drought, disease, and bark beetles above historical levels of mortality (van Mantgem et al. 2009, pp. 521–523; Asner et al. 2015, p. 249; McIntyre et al. 2015, p. 1458; Preisler et al. 2017, p. 166). When tree stand densities are too high compared to available resources (water, light, nutrients), trees become stressed due to competition for resources and thus are more vulnerable to mortality (USFS 2017, p. 9). Large trees are often especially prone to drought, disease, and beetle-related mortality (Smith et al. 2005, p. 266; Mueller et al. 2005, p. 1085; Allen et al. 2010, p. 668; McIntyre et al. 2015, p. 1458). Increased tree mortality may be contributing to loss of California spotted owl habitat (Gutiérrez et al. 2017, p. 137), but the magnitude of the impacts on California spotted owls is uncertain. Large-scale tree mortality reduces the availability of canopy cover and large trees, potentially resulting in California spotted owl population declines because of reduced habitat available for dispersal and occupancy. However, some tree mortality events can have some positive effects on California spotted owl habitat, as these events contribute to habitat heterogeneity and the availability of coarse woody debris for prey species.

Between 2010 and 2016, an estimated 102 million trees died across about 3,106,367 ha (7,676,000 ac) throughout California (Tree Mortality Task Force 2017, p. 2). By February 2019, total tree mortality in California increased to an estimated 147 million dead trees (Cal Fire and USFS 2019, p. 1). The latest estimate shows that between 2010 and 2021, the drought combined with subsequent beetle attacks resulted in approximately 173 million dead trees in California with approximately 3.3 percent of the surveyed forest area in 2021 showing signs of elevated mortality (USFS 2021, p. 5). The tree mortality events are particularly severe in the southern Sierra Nevada area. Most of the tree mortality observed is due to effects from the 2012–2016 drought, with less

mortality occurring from 2018–2021; however, another drought period started in 2020 (USFS 2021, p. 5).

In 2015, the Governor of California declared a state of emergency due to the unprecedented number of dead and dying trees in the State. In response, the California Tree Mortality Task Force, which is now the Forest Mortality Working Group within the California Wildfire and Forest Resilience Task Force, was created to coordinate emergency protective actions and monitor ongoing conditions. The group collects and manages the tree mortality data, provides recommendations to land managers, presents grants for research funding, and provides public outreach. The task force will likely continue to provide the services listed into the future due to the ongoing and large-scale nature of the tree mortality events in California.

Regulatory mechanisms and management actions could provide some protection from the effects of tree mortality. Efforts to restore historical forest conditions and reduce stand densities through fuels reduction treatments (mechanical thinning, prescribed fire, etc.) may indirectly contribute to reducing future tree mortality by reducing competition. Further, the goal should be to eliminate the excessive levels of tree mortality currently being observed in the landscape and not limit all tree mortality, as tree mortality is a natural part of the forest ecosystem and ultimately creates features important to California spotted owls (snags, tree cavities). Tree mortality is likely to continue throughout the range of the California spotted owl due to predicted increases in drought conditions that will likely continue to weaken trees and make them susceptible to bark beetles and disease (Millar and Stephenson 2015, pp. 823–826; Young et al. 2017, pp. 78, 85). Excessive tree mortality is likely to continue to be a threat into the future for the California spotted owl.

Drought

California has experienced extreme drought conditions in 2007–2009 and 2012–2016 (Williams et al. 2015, pp. 6823–6824; CDWR 2021, p. 4), and as of May 2022, a majority of the California spotted owl's range is considered in severe to moderate drought (CDWR 2022, entire). Anthropogenic warming likely contributed to more recent drought anomalies and increases the overall likelihood of extreme droughts in California into the future (Williams et al. 2015, pp. 6819, 6826; CDWR 2022, entire).

Drought conditions can negatively impact the California spotted owl's ecological needs. As described above, drought conditions contribute to tree mortality, which reduces canopy cover, likely leading to a decline in occupancy. Further, drought conditions likely reduce the availability of prey species (Franklin et al. 2000, p. 589; Glenn et al. 2010, p. 2549; Glenn et al. 2011, p. 174). Drought and hot temperatures in the previous summer are linked to lower reproductive success in California spotted owls (LaHaye et al. 2004, p. 1066) and lower survival and recruitment in northern spotted owls in the next breeding season (Glenn et al. 2011, pp. 159, 174). Inversely, increases in precipitation either before or after the nesting season are linked to increased survival and fecundity in all three subspecies of spotted owls (Seamans et al. 2002, p. 321; LaHaye et al. 2004, pp. 1056, 1064; Glenn et al. 2011, pp. 159, 174). Thus, drought likely negatively impacts the California spotted owl's habitat components, and its demographic needs of dispersal, survival, fecundity, and occupancy. No regulatory mechanisms or conservation measures in place ameliorate the direct impacts of drought. It is likely that drought conditions will continue to be a threat into the future across the California spotted owl's range and will likely worsen due to the effects of climate change.

Climate Change

Scientific measurements spanning several decades demonstrate that changes in climate are occurring and that the rate of change has been faster since the 1950s. There is strong scientific support for projections that warming will continue through the 21st

century, and that the magnitude and rate of change will be influenced substantially by the extent of greenhouse gas emissions (Meehl et al. 2007, pp. 760–764, 797–811; Ganguly et al. 2009, pp. 15555–15558; Prinn et al. 2011, pp. 527, 529; IPCC 2013, pp. 19–23).

Projected changes in climate and related impacts can vary substantially across and within different regions of the world (IPCC 2013, pp. 15–16). Therefore, we used downscaled projections from California's Fourth Climate Change Assessment, including the following four regional assessments that cover the California spotted owl's range: Sierra Nevada (Dettinger et al. 2018, entire), the Central Coast Region (Langridge 2018, entire), Los Angeles (Hall et al. 2018, entire), and San Diego (Kalansky et al. 2018, entire). Ten global climate models were used for all four regional assessments, and each model considered two different emissions scenarios, one in which greenhouse gas emissions continue to increase into the next century (RCP 8.5) and one in which greenhouse gas emissions stabilize by mid-century and then decline to levels seen in the 1990s by the end of the century (RCP 4.5) (Dettinger et al. 2018, pp. 15, 17; Hall et al. 2018, p. 9; Kalansky et al. 2018, p. 18; Langridge 2018, p. 12).

Under both emissions scenarios, projected annual average temperatures throughout the California spotted owl's range are projected to increase. The largest increases under both emissions scenarios and timeframes are projected for the eastern portions of the Sierra Nevada (Dettinger et al. 2018, p. 17, figure 2.3). Projected changes will result in greater temperatures than historically experienced in the Sierra Nevada, and this degree of temperature change will likely result in a shift in the rain to snow transition by 1,500–3,000 feet (Dettinger et al. 2018, pp. 17, 20). Projected temperature increases are more pronounced in the inland portions of the Central Coast Region, with the ocean acting as a buffer for coastal areas (Langridge 2018, p. 14, figure 4). In addition, the average number of extremely hot days (defined as days that exceed the 98th percentile of observed, historical (1961–1990) daily maximum temperatures between April 1 and

October 31) are expected to increase throughout the Central Coast Region (Langridge 2018, pp. 14–15, table 4).

Regional assessments covering southern California include the Los Angeles and San Diego Regional Assessments (Hall et al. 2018, entire; Kalansky et al. 2018, entire). Projected annual average maximum temperatures throughout the Los Angeles Region increase under both emissions scenarios (Hall et al. 2018, p. 10, figure 2). For the San Diego Region, projected annual average maximum and minimum temperatures also increase under both emissions scenarios. Similar to the Central Coast Region, these changes will be more pronounced in the interior portions of the Los Angeles and San Diego Regions (Hall et al. 2018, p. 11, figure 3).

In addition to temperature projections, the regional assessments for California's Fourth Climate Change Assessment also considered future changes in precipitation, both the amount and the timing. Within the Sierra Nevada Region, changes in precipitation are projected to be relatively small and will vary depending on the area. In general, average annual precipitation in the southern portion of the Sierra Nevada Region is projected to stay similar or decrease by 5 percent, regardless of emission scenario. In other portions of the Sierra Nevada Region, particularly along the eastern side, the amount of precipitation is projected to increase by up to 10 percent. In addition to projections showing the northern portions of the range will receive more precipitation than southern portions, areas at higher elevations are also more likely to receive an increase in precipitation. Although the average change in precipitation is projected to be small, the models show there will be an increase in extreme conditions with more dry days overall interspersed with higher intensity precipitation events, when they do occur (Dettinger et al. 2018, p. 19). Further, in some areas more precipitation will fall as rain instead of snow, as the rain to snow transition is projected to shift by 457–914 m (1,500–3,000 ft) (Dettinger et al. 2018, pp. 17, 20).

Similar to the Sierra Nevada Region, interannual variability within the Central Coast Region is expected to increase with more dry days overall, but more precipitation when rain events do occur (Langridge 2018, p. 16). In southern California, the amount of precipitation in the Los Angeles and San Diego Regions is highly variable (Hall et al. 2018, p. 12, figure 5; Kalansky et al. 2018, p. 24). Similar to other regions, projections for the Los Angeles and San Diego Regions show an increase in extreme conditions such as high-intensity precipitation events, known as atmospheric rivers, and severe drought conditions (Hall et al. 2018, pp. 13–14, figure 6; Kalansky et al. 2018, pp. 24–25, figures 7 and 9).

Because the California spotted owl has a wide geographic range and the projected changes in climate vary across the range, the effects those changes will have on the species and its habitat will vary. Future climate projections of Sierra Nevada vegetation distribution indicate that low- and mid-elevation forests are vulnerable to conversion to unsuitable habitat for California spotted owls, such as shrublands and grasslands (Gutiérrez et al. 2017, p. 215). These changes in climate may also include potential shifts in forest communities upslope, which would have impacts on both the California spotted owl's habitat and prey habitat (Gutiérrez et al. 2017, pp. 132, 215, 288). This potential upslope shift in suitable habitat may mitigate some climate-induced habitat threats over ecological time, although it would require many decades for suitable large nest trees to develop in areas where they do not currently exist (Gutiérrez et al. 2017, p. 215). These differences in net habitat loss versus net habitat gained under future climate scenarios will likely depend not only on the rate of warming but also how individual plant and prey species respond (Seamans and Gutiérrez 2007a, p. 61).

Changing climatic conditions may have direct impacts on California spotted owl physiology, survival, reproduction, recruitment, or population growth. The thermal neutral zone (the range of temperatures tolerated by a warm-blooded animal) for

California spotted owls is 18.2–35.2 ºC (64.8–95.4 ºF) (Weathers et al. 2001, p. 682). Above this zone, California spotted owls experience heat stress (Weathers et al. 2001, p. 678). The relatively low thermal neutral zone may make California spotted owls more susceptible to increased temperatures or cause behavioral or habitat shifts to cooler microclimates on the landscape. Behaviorally, California spotted owls can select cooler microclimates for roosting, especially within warmer forest stands (McGinn et al. in review, p. 2). Changing climatic conditions may also have indirect impacts including changes in habitat and prey distribution, abundance, and quality. California spotted owls must be able to adjust to the changing climate through behavioral changes, spatial shifts, or adaptation in order to persist. Under projected warming conditions in the future, cooler microclimate refugia are likely to be critically important for the persistence of California spotted owl individuals and populations (McGinn et al. in review, p. 3). It is likely that climate change will reduce the quantity and quality of California spotted owl habitat, which would likely result in population impacts, including a decrease in dispersal, fecundity, and occupancy. Both the habitat components and demographic factors of California spotted owls will likely be impacted by climate change, but the full extent of impacts climate change may have on California spotted owls is poorly understood (Wan et al. 2018, p. 690).

Climate modeling specific to the central Sierra Nevada portion of the California spotted owl's range has shown that maintaining high canopy cover, especially at higher elevations, will be important for California spotted owls to persist into the future, as high canopy cover helps maintain future refugia for individuals to select for cooler microclimates (Jones et al. 2016b, entire). Under both a low climate change prediction scenario (RCP 2.6) and a high climate change scenario (RCP 8.5), California spotted owl occupancy decreases in comparison to baseline climate conditions (Jones et al. 2016b, p. 901). However, this model did not consider projected increases in frequency and size of

high-severity fires due to climate change, which would likely result in more significant declines in occupancy than predicted by the model (Jones et al. 2016b, p. 903). Earlier modeling of spotted owl response to projected climate changes show that different subspecies and populations of spotted owls are anticipated to respond differently across their ranges (Peery et al. 2011, p. 14).

The climate change projections described above suggest increasing interannual climate variability throughout the range of the California spotted owl. Interannual climate variability is defined as when annual weather patterns differ from historical average climate, including prolonged drought conditions, heavy rain conditions, and higher or lower than average temperatures. Interannual climate variability has been shown to have impacts on the survival and reproductive success of California spotted owls. Drought conditions and hot temperatures during the summer have been found to reduce fecundity in California spotted owls during the next breeding season (LaHaye et al. 2004, p. 1056). Increases in precipitation either before or after the nesting season are linked to increased survival and fecundity, whereas increased precipitation during the nesting season reduces reproductive success (North et al. 2000, p. 804; LaHaye et al. 2004, pp. 1056, 1064). It is hypothesized that northern spotted owls exhibit a bet-hedging reproduction strategy and that an absence of reproduction is linked to environmental conditions (Franklin et al. 2000, pp. 539, 576). California spotted owls likely have a similar bet-hedging reproductive strategy (Stoelting et al. 2015, p. 46; Gutiérrez et al. 2017, pp. 14–15). California spotted owls are sensitive to warm temperatures and, therefore, may be physiologically sensitive to weather patterns with increased temperatures (Weathers et al. 2001, p. 684). Temperature, either too hot or too cold, may affect spotted owls directly by increasing energy demands (Gutiérrez et al. 2017, p. 20). This increase may have direct impacts on the physiology of spotted owls or on breeding if mates must bring more food to the nest for the female to survive. Increased interannual climate variability due to

climate change will likely impact the California spotted owl throughout its range, which would result in lower fecundity.

Regulatory mechanisms and management actions that are or could potentially provide some protection from the effects of climate change include the Clean Air Act (42 U.S.C. 7401 et seq.) and the California Global Warming Solutions Act. Both address climate change by reducing greenhouse gas emissions within the United States and California, respectively. There are no regulatory mechanisms or management actions that fully address the effects of the climate change.

The effects of climate change will continue to impact California spotted owls into the future by exacerbating the negative influencing factors described above, especially extreme weather events such as prolonged drought and severe storms. The loss or reduction of suitable habitat throughout the California spotted owl's range will likely reduce the subspecies' reproduction, occupancy, survival, recruitment, and population growth.

Fuels Reduction and Forest Management

Forest management has long been a controversial topic regarding species that require old growth forest habitat, including the spotted owl (Gutiérrez 2020, p. 337). With the increasing frequency and extent of high-severity fire in California in recent decades, fire mitigation has become a key issue for spotted owl management and conservation. The goal of fuels management is to reduce the buildup of fuels in forests that contribute to these large-scale, high-severity fires, which can effectively mitigate subsequent fire behavior and their effects, even under extreme weather (Hessburg et al. 2021, p. 7; Prichard et al. 2021, p. 9). The long-term benefits of properly managed fuel treatments for reducing the risk of severe wildfire are likely to outweigh the short-term negative impacts to spotted owl habitat (Ager et al. 2007, pp. 54–55; Roloff et al. 2012, p. 7; Jones et al. 2021b, pp. 4–5). These trade-offs are complex and ultimately depend on

the extent that treatments have negative impacts to owl habitat and the magnitude of effects from subsequent wildfires (Jones et al. 2021b, p. 2). Fuels reductions and forest management practices vary throughout the California spotted owl's range. Below, we discuss clearcutting, mechanical thinning, salvage logging, and prescribed fire, and the positive and negative influences that these practices can have on the species.

Clearcutting, sometimes referred to as even-aged management, is defined as an even-age regeneration or harvest method that removes all trees in the stand, producing a fully exposed microclimate for the development of a new age class in one entry (Gutiérrez et al. 2017, p. 292). The natural range of variation for forest gaps in the Sierra Nevada has been found to range from 0.03–1.17 ha (0.07–2.89 ac) (Safford and Stevens 2017, p. 140), and within the SSA report and this proposed rule, clearcutting refers to complete removal greater than the natural range of variation.

Clearcutting is a mostly historical threat to California spotted owls, although it still occurs in some areas of the Sierra Nevada. By removing entire stands of trees, clearcutting reduces the amount of large trees, high canopy cover, and coarse woody debris available for California spotted owls. Commercial timber harvest no longer occurs within the California spotted owl's range on public lands in the Coastal-Southern California DPS (Gutiérrez et al. 2017, p. 254). Clearcutting also does not occur on USFS lands on the eastern side of the Sierra Nevada range (Boatner in litt. 2022). Clearcutting still occurs on private timber harvest lands but is limited to 8.1-ha (20-ac) parcels by California State forest practice rules (California Code of Regulations (CCR), title 14, article 3 (14 CCR 913 et seq.)). Additionally, there must be at least 91.44 m (300 ft) of forested area between clearcuts, and adjacent lands cannot be cut for at least 5 years (14 CCR 913 et seq.). Even with the reduction of clearcutting in recent history, it will take decades or centuries for large trees to grow back from the past removal practices; therefore, there are residual effects that may be impacting California spotted owl

populations and the habitat that is available (Jones et al. 2018, p. 1). California spotted owls may use clearcut habitat, likely for foraging activities, but these areas are used significantly less than high canopy cover and large tree areas (Atuo et al. 2019, pp. 295, 301–302).

Mechanical thinning is a forest management strategy to thin trees either in even or uneven-aged stands by removing trees in rows, strips, or by using fixed pacing intervals, usually implemented to meet forest management objectives. It can be done for commercial harvest of trees or to reduce fuel loads to decrease the likelihood of large-scale, high-severity fires (Gutiérrez et al. 2017, p. 292). Within the SSA report and this proposed rule, we use "mechanical thinning" to include both individual tree selection (new age classes are created in uneven-aged stands by removing individual trees of all size classes more or less uniformly throughout the stand to achieve desired stand structure) and group tree selection (treatment involves salvage harvest in a stand where small groups of trees are harvested because of tree mortality due to windstorm, wildfire, insects, disease, or other animals).

Mechanical thinning is actively used to manage forests occupied by California spotted owls and can have positive or negative impacts on the California spotted owl's habitat and demographics depending on the specific methods used. The 2004 Sierra Nevada Forest Plan Amendment promotes reducing, using methods including mechanical thinning, unnaturally dense forest conditions on the landscape to reduce the risk of large-scale, high-severity fire (USFS 2004, pp. 34–35). Minimal area is treated mechanically, especially when compared to area burned by wildfire (566,560 ha (1,400,000 ac) burned between 2017–2020 versus 61,852 ha (152,842 ac) previously treated; North et al. 2021, p. 524). Treatments are located to avoid California spotted owl activity centers to the greatest extent possible (USFS 2004, pp. 34–35), which often leaves the PACs untreated and potentially vulnerable to stand-replacing fires (Stephens et al. 2019, p. 395). Further,

strategic thinning can promote forest resiliency, but removing some large, fire-intolerant tree species like fir and cedar may be necessary to promote future resilience of forested habitat (Stephens et al. 2020, entire; North et al. 2021, p. 530).

Resilience of California spotted owl habitat results from low stand densities, which reduces competition and allows trees to grow, so more intensive fuels treatments (mechanical thinning and prescribed fire) may be needed to achieve historically lower levels of tree densities (North et al. 2022, p. 6). When conducted outside California spotted owl activity centers, mechanical thinning will likely reduce the amount of damage the habitat may experience due to high-severity fire while also minimizing short-term habitat impacts (Stephens et al. 2014, p. 904; Tempel et al. 2015, p. 1; Chiono et al. 2017, p. 1). Strategic mechanical thinning to reduce fuel loads and reduce the risk of large-scale, high-severity fire, while also maintaining the necessary forest structure components of large trees, multi-layered high canopy cover, habitat heterogeneity, and coarse woody debris, will be important for California spotted owl management into the future (Jones et al. 2016a, p. 305; Tempel et al. 2016, p. 305; Jones et al. 2019, p. 22). Strategically placed landscape fuel treatments can decrease future fire severity while also increasing seedling densities (Tubbesing et al. 2019, p. 54). Many studies emphasize the importance of scaling-up fuel reduction treatments (mechanical thinning and prescribed fire) and suggest an increased benefit of treating within California spotted owl territories for long-term persistence, although positive effects would not be observed until mid-century and treatments should still strive to maintain large trees and high canopy cover forest (Jones et al. 2021b, p. 3; Safford et al. 2022, p. 17).

This fuels management technique has little to no impact on occupancy if carried out in a strategic way (for example, maintaining some patches of high canopy cover mixed with patches of moderate canopy cover to provide for the primary habitat of California spotted owls and incorporating limited operating periods that restrict activities

from occurring during the critical nesting period) (Tempel et al. 2016, p. 747). However, mechanical thinning can decrease California spotted owl occupancy and is negatively correlated with reproduction (Tempel et al. 2014a, p. 2089; Stephens et al. 2014, p. 903; Tempel et al. 2022, p. 19). Although one study detected some negative effects of fuels reduction treatments on California spotted owls in southern California, the authors suggested that occupancy declines were small compared to the potential negative effects of fire (Tempel et al. 2022, p. 22). Similarly, there is evidence of reduced foraging in fuel treatment areas that have a moderate to high proportion of forest gaps with little to no canopy cover (Gallagher et al. 2018, pp. 487, 494–499). Forest thinning has complex effects on both California spotted owls and their mammalian prey species. Thinning may have negative short-term effects on prey species by increasing the risk of predation by removing above-ground cover and reducing canopy connectivity, and thinning may remove suitable nesting substrates; however, there may be positive effects in the long term (over decades) by promoting growth of the midstory layer of trees that is favorable to certain mammalian prey species (Wilson and Forsman 2013, p. 79).

Salvage logging is a practice where damaged or dying trees are removed to recover their economic value and promote forest health (Gutiérrez et al. 2017, p. 293; Jones et al. 2020, p. 11). Salvage logging often occurs after natural disturbances such as wildfires, disease, and insect infestation (Lindenmayer et al. 2008, p. 4). Post-fire fuels treatment that includes the removal of smaller trees and surface and ladder fuels is not generally considered a threat to California spotted owls relative to the threat posed by megafires (Jones et al. 2021b, p. 7). Negative effects of salvage logging have been documented for wildlife, vegetation, and soils, but there is a paucity of literature on the subject, which may lead to inaccurate comparisons when studies occur across varied geographic regions; nevertheless, the negative effects may be mediated by altering equipment, timing of operations, and harvest prescriptions to leave more large snags

(Nemens et al. 2019, entire). California spotted owls inhabit areas of low-medium severity fire, patchy high-severity fire, and areas with dead trees; therefore, salvage logging likely reduces the amount of habitat available for California spotted owls (Gutiérrez et al. 2017, p. 276). Salvage logging can result in short-term decreased vegetation regrowth (Wagenbrenner et al. 2015, p. 176), which would likely impact prey species for California spotted owls. However, salvage logging does not appear to make much difference in long-term vegetation regrowth, so salvage logged areas have the potential to again become suitable habitat after the centuries it takes to establish large trees in the area (Peterson and Dodson 2016, p. 56). Salvage logging in certain instances may also be necessary to reduce future fire severity as high levels of dead biomass are associated with high-severity fire (Lydersen et al. 2019, p. 7; Stephens et al. 2022, p. 8); salvage logging may also be required for restoration personnel to safely access an impacted site for re-planting activities (Sawyer in litt. 2022).

The California spotted owl's response to salvage logging appears to be at least partly dependent on the characteristics of the fire after which it occurs, which can make it difficult to analyze these relationships (detailed in Jones et al. 2019). For example, salvage logging that occurs within a large, burned area is less likely to negatively impact spotted owls relative to salvage logging that occurs within a smaller burned area (Jones et al. 2020, p. 12). There is some evidence that northern spotted owl (Clark et al. 2012, p. 15) and California spotted owl occupancy decreases with salvage logging (Lee et al. 2013, p. 1327; Lee and Bond 2015, p. 228; Hanson and Chi 2021, p. 5), while other evidence suggests that salvage logging has no effect on California spotted owl persistence or colonization (Jones et al. 2021b, p. 5). Salvage logging can be a threat to California spotted owls when their habitat components of large trees, coarse woody debris, and habitat heterogeneity are removed from the landscape, resulting in a decrease in occupancy at the population level. The 2004 Sierra Nevada Forest Plan Amendment

prohibits salvage harvest in California spotted owl PACs unless a biological evaluation determines that the areas proposed for harvest have been rendered unsuitable for the purpose they were intended (i.e., California spotted owl habitat) by a catastrophic stand-replacing event (USFS 2004, pp. 52–53).

Prescribed fire or cultural burning as a tool for ecosystem management had been used for millennia by Native Americans; with the colonization of North America, Europeans introduced a culture of fire suppression onto the landscape (Marks-Block et al. 2021, p. 3). Wildfire suppression is still the dominant management practice over prescribed or controlled burning across much of western North America (Stephens et al. 2019, p. 391). Between 2017 and 2020, approximately 49,000 ha (120,000 ac) per year were treated with prescribed burning across Federal, State, and Tribal lands in California (Gabbert 2022, entire). The State of California recently released a report outlining a plan to increase the use of "beneficial fire" to 162,000 ha (400,000 ac) annually by 2025 (California Wildfire & Forest Resilience Task Force 2022, p. 3). Spotted owls can persist in low- and moderate-severity fire areas with similar probabilities to unburned landscapes (Roberts et al. 2011, p. 617), demonstrating their adaptation to a natural fire regime (Verner et al. 1992, pp. 247–248; Stephens et al. 2019, p. 394). However, studying the relationship between spotted owls and prescribed fire alone is difficult because there are usually confounding factors of past timber harvest or salvage logging (Clark et al. 2012, p. 15). Prescribed "ecologically beneficial" fire is an important tool for protecting nesting and roosting habitat from catastrophic fires and for maintaining diverse California spotted owl habitat throughout the landscape (Roberts et al. 2011, p. 617; Stephens et al. 2019, p. 394).

Fuels reductions and forest management practices within the California spotted owl's range include clearcutting, mechanical thinning, salvage logging, and prescribed fire. Depending on the method used and how it is implemented, fuels reductions and

forest management practices can have both positive and negative influences on the species. The existing regulatory mechanisms and conservation measures do not completely ameliorate the negative impacts of fuels reductions and forest management practices to California spotted owls; however, land management direction, including the Sierra Nevada Forest Plan Amendment, includes protective standards and guidelines that must be adhered to while conducting management activities in California spotted owl habitat.

Fuels reduction in some form is necessary to ensure California spotted owl habitat persistence because long-term gains in habitat protection outweigh the short-term negative effects, especially when conservation measures are implemented appropriately (Jones et al. 2021a, p. 2; Jones et al. 2021b, entire; North et al. 2022, entire; Safford et al. 2022, entire). Differences in forest management may help explain why California spotted owl populations occurring in some mixed ownership landscapes have higher occupancy, density, and probability of reproduction compared to public land (Roberts et al. 2017, p. 113; Hobart et al. 2019, p. 198; SPI et al. 2022, pp. 9, 17). The need to increase the pace and scale of fuels reduction efforts is recognized across agencies, and, recently, the Department of the Interior announced funding through the Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act, Pub. L. 117–58, 135 Stat. 429) to increase fuels treatments across the United States (DOI 2022, entire). The USFS also identified preliminary projects to address fuel reduction projects through its wildfire crisis landscape investments, and two projects are expected in the near term within the California spotted owl's range that include mechanical thinning and prescribed fire (Tahoe National Forest and the Stanislaus National Forest; USFS 2022a, entire). Fuels reductions and forest management practices will likely continue to have varied effects on California spotted owls throughout the species' range.

Competition and Hybridization with Barred Owls

The barred owl is a closely related species to the spotted owl, native to eastern North America (Mazur and James 2000, "Introduction" section). Since the 1960s, the barred owl has been extending its range westward, first coming in contact with northern spotted owls and more recently moving into the California spotted owl's range (Peterson and Robins 2003, p. 1162; Livezey 2009, p. 49; Keane et al. 2018, p. 5). Barred owls were first detected in northwestern California in 1982 (Evens and LeValley 1982, p. 890), the Sierra Nevada in 1991 (Dark et al. 1998, p. 53), and along the coast as far south as Marin County in California by 2002 (Jennings et al. 2011, p. 105).

Barred owls and spotted owls have similar habitat requirements, with old forests representing high-quality habitat for both, although barred owls use a broad mix of forest types (Wiens et al. 2014, pp. 14, 32). Because barred owls have more habitat flexibility than spotted owls, there is potential for barred owls to expand into spotted owl habitat through corridors of lower quality habitat. For example, recent barred owl sightings from Davis, California (eBird 2022, entire), suggest that barred owls could expand across the Central Valley into California spotted owl habitat from the west in addition to the more likely pathway through forests in the Sierra Nevada. Although the California spotted owl's range has a gap between the Sierra Nevada DPS and the Coastal-Southern California DPS, barred owls may be able to colonize the coastal-southern California spotted owl's range because of the barred owl's ability to use other forest types. Detections of barred owls in coastal forests in the Santa Cruz Mountains in San Mateo County, California, an area without known occurrences of the California spotted owl, suggests a pathway towards connectivity to the coastal portion of the California spotted owl's range.

Barred owls are aggressively outcompeting and displacing spotted owls on the landscape (Wiens et al. 2014, p. 1; Gutiérrez et al. 2017, p. xvi; Long and Wolfe 2019, entire). Barred owls are larger than spotted owls (Gutiérrez et al. 2007, pp. 185–186) and

behaviorally dominant (Van Lanen et al. 2011, pp. 2197–2198). Although diet overlaps between the two species, with both predominantly feeding on nocturnal mammals, barred owls are generalists that consume many more prey species in comparison to spotted owls (Wiens et al. 2014, pp. 24–25; Kryshak et al. 2022, pp. 12–13).

Competition between the two species results in negative effects to the survival, productivity, and recruitment of northern spotted owls (Dugger et al. 2016, pp. 69–91), and barred owls have been described as demographically superior to northern spotted owls because they have higher survival estimates and produced, on average, 4.4 times more young than northern spotted owls over a 3-year period (Wiens et al. 2014, p. 28). The presence of barred owls has caused lower detection rates and occupancy probabilities in northern spotted owls (Olson et al. 2005, p. 918; Crozier et al. 2006, p. 760; Kroll et al. 2010, p. 1264; Yackulic et al. 2012, p. 1953; Yackulic et al. 2014, p. 265). Although there is some evidence that lower detection rates may be in part due to northern spotted owls responding less frequently in the presence of barred owls (Crozier et al. 2006, p. 760), the negative effects of barred owls on spotted owls are clear.

Although there is no evidence of barred owls wounding or killing northern spotted owls (Wiens et al. 2014, p. 33), competition ultimately has population-level effects because of impacts to occupancy and reproduction. Additionally, barred owls can hybridize with spotted owls (Gutiérrez et al. 2017, p. 211). There are likely broader impacts on the ecosystem from the barred owl's range expansion, such as an imbalance in predator/prey relationships, causing even greater impacts to spotted owl interspecific competition (Holm et al. 2016, p. 615). Because of the wide and diverse diet of barred owls in comparison to spotted owls, barred owls will not be ecological replacements to the spotted owls that they displace, and this could have widespread ecological impacts (Kryshak et al. 2022, pp. 15–16).

Barred owl detections within the California spotted owl's range have continued to increase. From 1989 to 2013, 51 barred owls and 27 barred owl/spotted owl hybrids had been detected in the Sierra Nevada (Gutiérrez et al. 2017, p. xxv). By 2017, the number of barred and barred owl/spotted owl hybrid detections in the Sierra Nevada increased to approximately 145 (Keane et al. 2018, p. 7), with another 2.6-fold increase between 2017 and 2018 (Wood et al. 2020, p. 4). Even these seemingly low numbers of barred owls in the California spotted owl's range are of concern, given that in the northern spotted owl's range, replacement of northern spotted owls began at a slow rate in the early years of the expansion, followed by a rapid rate of replacement once the barred owl population reached a critical mass (Forsman in litt. 2018, p. 1). As shown, over the last 10 years in particular, barred owl detections throughout the California spotted owl's range have increased at a higher rate (Service 2022, figure 11).

Experimental barred owl removal studies were first initiated and are currently ongoing in the northern spotted owl's range (e.g., Diller et al. 2012, entire; Wiens et al. 2020, entire). In Washington and Oregon, removals successfully decreased site use by barred owls and increased northern spotted owl use within treatment areas (Wiens et al. 2021, entire). Further, successful barred owl removals can result in competitive release for spotted owls (Wiens et al. 2021, pp. 4–5) (competitive release describes a situation in which one of two similar species competing for the same resources is removed, allowing the remaining species to use more of the resources; this is generally considered beneficial for the remaining species). In another (smaller) example of barred owl removals within the northern spotted owl's range, after nine barred owls were removed from historical northern spotted owl sites, all sites were re-occupied by northern spotted owls within a year of removal: four by the original residents and five by new residents (Diller et al. 2012, p. 405). However, barred owls again replaced the northern spotted owls at three sites within 1–4 years of the northern spotted owls reoccupying those territories (Diller et

al. 2012, p. 405). Overall, evidence to date indicates some measure of success for northern spotted owls related to barred owl removal efforts in at least some cases. However, species experts caution that forest conditions, densities of barred owls, and numbers of spotted owls would all factor into whether or not similar results could be obtained in other areas (Wiens et al. 2020, p. 1).

Experimental barred owl removal studies have also recently been initiated in the California spotted owl's range, specifically in the Sierra Nevada (Hofstadter et al. 2022, entire). In 2017, a California spotted owl conservation assessment concluded that control measures for barred owls in the California spotted owl's range were likely to be more successful and cost efficient while densities of barred owls are still relatively low in the California spotted owl's range, and that if control measures were not taken, barred owls would most likely replace California spotted owls on the landscape in the future (though the timescale of this replacement was uncertain) (Gutiérrez et al. 2017, pp. xxxi, xxv; see also Wood et al. 2020, pp. 5–7). Within the California spotted owl's range, barred owl removal experiments were initiated in 2018, and have continued through 2022 (Hofstadter et al. 2022, entire). Between 2018 and 2020, researchers removed 76 owls (63 barred owls and 13 hybrids) from the Sierra Nevada, decreasing barred owl occupancy by a factor of 6.3 down to 0.03 (confidence interval: 0.01–0.04). Experimental removals were guided by passive acoustic monitoring, which was also used to measure the efficacy of removals. Partnerships were crucial to the regional-scale removal, with public-private partnerships allowing access to 92 percent of the California spotted owl's range in the Sierra Nevada, including almost all known barred owls in the area and minimizing refugia for barred owls. California spotted owls rapidly colonized territories where barred owls were removed: 15 out of 27 territories were recolonized by California spotted owls within 1 year of barred owl removals, with successful breeding documented in five of these territories (Hofstadter et al. 2022, pp. 4–5). Early and effective

experimental removals of barred owls within the California spotted owl's range in the Sierra Nevada has dampened the urgency of this threat, but the potential for continued and persistent expansion into the range remains. Funding is currently available to continue barred owl removal experiments in the California extent of the Sierra Nevada through 2024 (Peery in litt. 2022). However, continued barred owl monitoring and experimental removal would likely need to continue into the future (Hofstadter et al. 2022, p. 6). Management options are currently being evaluated for potential future implementation.

Regulatory mechanisms and management actions that are providing or could potentially provide some protection from the effects of barred owl expansion include management teams, management plans, and habitat conservation plans (HCPs) that coordinate, fund, and implement the experimental removals described above. However, barred owls are a significant threat to the persistence of California spotted owls, and we expect the magnitude of the threat to increase into the foreseeable future, particularly if management efforts are not continued.

Rodenticides

Exposure of nontarget wildlife to anticoagulant rodenticides threatens many species, including California spotted owls, likely because of ingestion of exposed prey animals, known as secondary exposure (Gabriel et al. 2018, p. 5; Franklin et al. 2018, p. 2). Secondary exposure to anticoagulant rodenticides in predators such as raptors can be lethal, with higher levels causing severe blood loss and internal hemorrhaging that can result in organ failure and death (Gomez et al. 2022, p. 147). Although this threat has potential impacts to individuals, the loss of just a few individuals may reduce survival and the population growth rate because the California spotted owl is a long-lived species with low reproductive rates. This threat would be particularly detrimental if a parent were exposed during the breeding season because hatchlings and juveniles rely on parental

care to survive, so the loss of just one parent would likely result in the loss of offspring as well.

Rates of mortality in free-living wild birds due to anticoagulant rodenticides are often unknown due to the difficulty of linking exposure to death and the lack of understanding of toxicity thresholds in different species (Gomez et al. 2022, pp. 147–148). Documentation of anticoagulant rodenticides in ovaries of female barred owl suggests the possibility for in-utero transfer to chicks (Hofstadter et al. 2021, pp. 7–8). Sub-lethal effects of anticoagulant rodenticides in other owl species include reduced clutch size, brood size, fledging success, slower clotting time, residual transfer to eggs, anemia, and impaired mobility; however, these impacts have not yet been documented in spotted owls (Rattner et al. 2012, p. 832; Salim et al. 2014, p. 113; Gabriel et al. 2018, p. 7; Gomez et al. 2022, p. 148).

Although there is little information specific to California spotted owls regarding the exposure rates and resulting impacts of rodenticides, available literature on other species suggests the potential for widespread exposure. Exposure of nontarget species to anticoagulant rodenticides is commonly associated with agricultural or urban settings, but exposure in forest settings in northern California is detrimental to northern spotted owls and barred owls (Gabriel et al. 2018, p. 5; Franklin et al. 2018, p. 2). Seven out of 10 northern spotted owl carcasses tested positive for anticoagulant rodenticides, and 40 percent of 84 barred owls tested in the northern spotted owl's range had been exposed (Gabriel et al. 2018, pp. 4–5). In another study using barred owls as a proxy for spotted owls, almost half of barred owls sampled (n=40) and one northern spotted owl sampled demonstrated exposure to anticoagulant rodenticides (Wiens et al. 2019, p. 4). High rates of exposure were also demonstrated in barred owls and barred owl/spotted owl hybrids in California, with females having higher rates of exposure than males (Hofstadter et al. 2021, pp. 6–7). Large amounts of rodenticides and other pesticides have been found on

USFS land in the southern Sierra Nevada (Thompson et al. 2013, pp. 95–99). Approximately 85 percent of fisher (*Martes pennanti* -- a carnivorous predator with similar habitat requirements as California spotted owls) carcasses tested in the Sierra National Forest had been exposed to rodenticides (Gabriel et al. 2012, pp. 1–14; Thompson et al. 2013, pp. 91).

Anticoagulant rodenticide use has increased throughout California with increases in illegal marijuana cultivation, as anticoagulant rodenticides are used to control rodent damage to the plants (Franklin et al. 2018, p. 1). A comparison of marijuana cultivation site likelihood with northern spotted owl suitable habitat found almost 50 percent overlap between the two (Wengert et al. 2021, p. 10). Although the number of illegal marijuana growing operations within the California spotted owl's range is unknown, considering the number of illegal marijuana growing operations found throughout the State, there are likely thousands within the California spotted owl's range (Gabriel et al. 2012, pp. 12–13; Thompson et al. 2013, pp. 95–99; Gabriel et al. 2018, p. 6).

In 2014, the California Department of Pesticide Regulation restricted the purchase, possession, and use of anticoagulant rodenticides in the State to purchase and use by a certified pesticide applicator with a permit issued by the county agricultural commissioner in order to protect wildlife; however, anticoagulant rodenticides associated with illegal marijuana grows are more likely the source of contaminants. If illegal marijuana grows are found, State law enforcement will shut the operations down, but there is currently no standardized clean-up protocol and a limited amount of funding to ensure removal of all rodenticides. Recently there has been an increased effort to locate and shutdown illegal marijuana grows on public lands in California called Operation Forest Watch (Department of Justice 2018, entire). Overall, anticoagulant rodenticides are likely affecting owls across their range, and we expect this threat will continue into the foreseeable future.

Development

Anthropogenic land use (including both cultivation and development) in California is expected to increase 28 percent by 2100 with a projected 3 percent decrease in overall forest land cover (Sleeter et al. 2017, pp. 1068, 1075). Urbanization is projected to be a primary driver of land use and land cover change in California over this time frame (Sleeter et al. 2017, p. 1076). Urban development is a threat throughout the range of California spotted owls; however, the threat is more substantial in the coastal and southern California population (Sleeter et al. 2017, p. 1081, figures 6 and 7). A majority of California spotted owl habitat occurs on public lands (approximately 71 percent of total range); therefore, this threat is primarily limited to a small amount of private lands.

Southern California faces high development demands with specific threats of wind farms and large reservoirs impacting connectivity within the California spotted owl's range (Gutiérrez et al. 2017, pp. 253–254). Loss of riparian areas due to water diversion in southern California has created barriers to dispersal among small populations (Gutiérrez et al. 2017, pp. 253–254). The southern California area of the California spotted owl's range is fragmented, with low dispersal between populations, so more development could further exacerbate fragmentation (LaHaye et al. 2001, p. 692; Barrowclough et al. 2005, p. 1116; Gutiérrez et al. 2017, pp. 253–254)

In the Sierra Nevada, low- to mid-elevation development is considered a threat to the California spotted owl and its habitat (Verner et al. 1992, pp. 264–265). Low- and mid-elevation zones in the Sierra Nevada continue to experience human population growth, which may increase the demand for development. Fifty percent of known California spotted owl sites on the west slope of the Sierra Nevada are considered wildland-urban interface and may be vulnerable to further development (Gutiérrez et al. 2017, p. 207). The northern Sierra Nevada is expected to have a higher level of forest

harvest compared to other parts of the California spotted owl's range (Sleeter et al. 2017, p. 1081, figure 7). Overall, development is likely affecting owls across their range, and we expect this threat will continue into the foreseeable future.

Conservation Efforts and Regulatory Mechanisms

Mechanisms and actions related to the California spotted owl and its habitat include State and Federal laws and regulations, federal incidental take permits, and forest management on USFS lands. In this proposed rule, we describe the key actions related to the California spotted owl and its habitat. For a full description of all conservation efforts and regulatory mechanisms, please see the SSA report (Service 2022, pp. 57–66).

The USFS has been a part of ongoing conservation efforts for California spotted owls, including the 2004 Sierra Nevada Forest Plan Amendment, which includes USFS land in the Lassen, Plumas, Tahoe, Humboldt-Toiyabe, Eldorado, Stanislaus, Sierra, Inyo, and Sequoia California spotted owl analysis units, and the 2005 Southern California National Forest Land Management Plans, which includes the Los Padres, Angeles, San Bernardino, and Cleveland California spotted owl analysis units. In 2019, the Inyo National Forest completed its own land management plan, and revised forest plans for the Sierra and Sequoia National Forests are expected to be final in 2023 (Miller in litt. 2022). Once these plans are finalized, the Inyo, Sierra, Sequoia National Forests will follow their individual plans and no longer follow the 2004 Sierra Nevada Forest Plan Amendment. All of these are regulatory documents that provide conservation measures for California spotted owls on USFS lands (USFS 2004, entire; USFS 2005, entire; USFS 2019a, pp. 43–47; USFS 2022b, pp. 59–68; USFS 2022c, pp. 59–68). The main goals of these conservation efforts include protection and management of California spotted owl activity centers and home range core areas, increasing the frequency of large trees on the landscape, and increasing structural habitat diversity. The goals relate to increasing the condition of the species' ecological needs to increase resiliency and provide conservation

efforts related to the threats of large-scale, high-severity fire; clearcutting; mechanical thinning; and salvage logging.

The 2004 and 2005 USFS land management plans and the 2019 Inyo National Forest and 2022 draft versions of the Sierra and Sequoia National Forest plans maintain the designation of PACs for California spotted owls, which encompass the best available 121 ha (300 ac) of habitat in as compact of a unit as possible around a nest tree (USFS 2004, p. 37; USFS 2005, p. 109; USFS 2019a, p. 43; USFS 2022b, p. 61; USFS 2022c, pp. 61–62). There are special considerations for any land management activities or projects that may take place within a PAC. Depending on the plan, management standards and guidelines include conducting surveys during the planning process of vegetation treatments where appropriate (i.e., in areas of suitable habitat for California spotted owls), limiting activities to reducing surface and ladder fuels through prescribed fire, limiting mechanical treatments to only allow fuel reduction treatments in some wildland urban defense zones where prescribed fire is not feasible, identifying maximum size of canopy gaps created within California spotted owl territories, requiring a limited operating period for when vegetation treatments can occur, and limiting the impacts a vegetation treatment can have on a PAC per year (USFS 2004, pp. 50–51, 54, 60–61; USFS 2005, pp. 7, 82–83; USFS 2019a, pp. 43–47; USFS 2022b, pp. 63–68; USFS 2022c, pp. 63–68).

In addition to protections, the 2004 Sierra Nevada Forest Plan Amendment and the 2022 version of the Sierra and Sequoia National Forest Plans outline desired conditions for PACs and other large habitat blocks within the home range that include at least two tree canopy layers, dominant and co-dominant trees with average diameters of at least 61 cm (24 in) dbh, at least 60 percent to 70 percent canopy cover, some very large snags (greater than 114 cm (45 in) dbh), and snag and course woody debris levels that are higher than average (USFS 2004, pp. 37, 39–40; USFS 2022b, pp. 60–61; USFS 2022c,

pp. 60–61). As discussed below, in April 2019, the USFS finalized a new California spotted owl conservation strategy for the Sierra Nevada (USFS 2019b, entire). The intention of the strategy is to be used for adaptive management and to be incorporated into future forest plan updates, although it is not legally enforceable and does not commit agency action or inaction.

As described above in "Fuels Reduction and Forest Management," there is disagreement about whether or not measures in these plans, such as mechanical thinning, are beneficial or detrimental to California spotted owls, and whether or not protections afforded to PACs are sufficient to ameliorate impacts to California spotted owls (John Muir Project of Earth Island Institute and The Wild Nature Institute 2014, pp. 70–71, 98, 108; Sierra Forest Legacy and Defenders of Wildlife 2015, pp. 39–40). However, a meta-analysis of California spotted owl occupancy and forest management practices indicated that mechanical thinning treatments that maintain canopy cover at 40 percent or greater would not substantially reduce California spotted owl occupancy, although canopy cover at 50 percent or above is more strongly correlated with California spotted owl occupancy (Tempel et al. 2016, pp. 761–762). Forest management practices from the 2004 Sierra Nevada Framework generally maintain at least 50 percent canopy cover as well as large trees within PACs, and in the 2005 Southern California plan, 40–50 percent canopy cover must be maintained. The 2019 Conservation Strategy also maintains a minimum of 50 percent canopy cover within PACs (USFS 2019b, p. 28). Overall, PACs are designated to preserve key habitat used by California spotted owls, and some researchers have concluded that PACs are a key conservation tool that should continue to be implemented (Berigan et al. 2012, pp. 300, 303). In contrast, other research has shown that PACs can be more susceptible to the effects of high-severity fire due to the relatively larger amounts of surface fuel (North et al. 2012, p. 395).

In April 2019, the USFS completed an updated California spotted owl conservation strategy for the Sierra Nevada national forests (USFS 2019a, entire). The updated strategy includes new scientific understanding since the 2004 Sierra Nevada Forest Plan Amendment and will be incorporated into national forest land management plans as they are updated in the coming years, in accordance with USFS regulations in title 36 of the Code of Federal Regulations (CFR) at part 219. Until the revised national forest land management plans can be completed, the Pacific Southwest Region of the USFS sent a letter of direction to the Sierra Nevada national forests on April 19, 2019, to provide guidance on implementing the new conservation strategy in the interim (USFS 2019b, entire). The new conservation strategy gives direction for increased pace and scale of ecological restoration to provide more resilient habitat for California spotted owls, while simultaneously continuing to protect the most important habitat attributes and areas for California spotted owls.

The three main goals for the 2019 conservation strategy include: (1) Maintain a well-distributed and stable California spotted owl population across the Sierra Nevada by minimizing impacts from non-habitat threats (such as barred owls and contaminants); (2) promote and maintain well-distributed California spotted owl habitat by developing key habitat elements and connectivity; and (3) promote California spotted owl persistence by enhancing habitat resilience to multiple disturbances, considering climate change. This increased habitat resilience will lead to improved conditions on the landscape and greater population resiliency. The new strategy provides adaptive management and metrics for success in order to ensure the conservation measures outlined in the plan are beneficial to California spotted owls.

In addition to the conservation strategy, the USFS is planning to implement a new monitoring plan using acoustic recording units to cover the Sierra Nevada portion of the California spotted owl's range. The goal is to use the information from the new

monitoring plan to allow the USFS to conduct a future California spotted owl occupancy modeling effort to provide information over a larger portion of the California spotted owl's range and allow greater potential for inference on broad-scale effects of restoration and disturbance (USFS 2019c, pp. 14–15). Elements of the strategy may entail some short-term, localized reduction in occupancy. These elements allow for more forest management flexibility in application of fuels reduction and other landscape treatment projects as compared to the 2004 Sierra Nevada Forest Plan Amendment both within PACs and on the landscape, as well as more flexibility in the retirement of PACs when they are no longer occupied. Additional flexibility in these landscape treatments provides access to additional tools to maintain and restore California spotted owl habitat (USFS 2019a, entire). We anticipate that the short-term impacts that may occur for the purpose of fuel reduction and forest health will be outweighed by the long-term benefit as more sustainable and dynamic habitat is developed through active management (USFS 2019a, p. 2).

On August 30, 2017, an MOU (hereafter referred to as the Fire MOU) was signed by SPI, CAL FIRE, National Fish and Wildlife Foundation, and the USFS, which will impact all lands from Lassen National Forest south through Stanislaus National Forest. The purpose of the Fire MOU is to document the agreement between the parties to coordinate on certain actions to reduce the risk of large-scale, high-severity wildfire through forest fuels reduction to benefit California spotted owl conservation. This MOU involves establishing a strategic conservation framework to help restore and protect areas where California spotted owls are threatened by habitat degradation due to uncharacteristically extensive and severe adverse fire effects. The Fire MOU is designed for signatories to engage in collaborative landscape-level fuels and fire risk reduction treatments to: (1) Minimize potential fire-related impacts to California spotted owl activity centers on Federal, State, and private lands; and (2) better coordinate

implementation of fuels reduction work on Federal, State, and private lands to maximize the effectiveness of this work. Sites for fuels treatment are selected to minimize risk to known occupied California spotted owl activity centers. Measures associated with the Fire MOU include fire management activities such as increased mechanical thinning that may benefit California spotted owls by decreasing risk of large-scale, high-severity fire. If mechanical thinning is planned with consideration of the California spotted owl's habitat needs, there may be some negative impacts, but these would be outweighed by reducing the risk of large-scale, high-severity fire in California spotted owl activity centers (Jones et al. 2016a, p. 305; Service 2017, pp. 24–25; Chiono et al. 2017, p. 1; Jones et al. 2021b, p. 6).

The USFS, SPI (a private corporation), and CAL FIRE manage forest lands in California that are frequently adjacent to each other and have ongoing programs to protect and enhance habitat for fish and wildlife. On these lands, forest fuels are managed to reduce fire risk and its potential impacts on wildlife species. Under State law, SPI has the authority to participate in fire suppression on its own lands, while CAL FIRE, contract counties, USFS, and other government agencies have primary fire suppression responsibility for all Federal, State, and private wildlands in California. The parties also have responsibilities and interests in the inventory of their respective lands for species recognized as endangered, threatened, proposed as endangered or threatened, candidate, and sensitive species by the Federal or State government. The parties also have responsibility and interest in the development of appropriate protection measures for these species. Due to these natural resource challenges, the Fire MOU parties believe it is important to establish a coordinated, multi-stakeholder agreement to help protect and enhance forest resources.

Though the Fire MOU was initially set to expire on December 2019, an amendment was signed in April 2019 to extend the terms of the MOU through December

2024. In March 2020, a new MOU that supersedes the 2017 MOU and 2019 amendment was signed by the same parties. An amendment to the 2020 Fire MOU was signed in September 2020 to add a number of new commercial forest landowners. The terms of the 2020 MOU are effective through December 2024. The Service is actively engaged with the signatory parties to discuss fuels reduction efforts and associated monitoring.

Barred owls have expanded into western North America over the past several decades, first through the Pacific Northwest and more recently into the Sierra Nevada. The Service and the USFS are funding researchers at the University of Wisconsin-Madison to carry out an ongoing barred owl removal study. The project grant was signed in August of 2018, and funding has been secured from the Service and potentially University of Wisconsin-Madison through 2025 (Peery in litt. 2022). The project addresses several key questions related to the range expansion of barred owls in the Sierra Nevada and will inform the development of a scientifically based barred owl management plan. Specifically, this project: (1) Assesses the current distribution and density of barred owls; (2) conducts experimental barred owl removals; (3) tests for reductions in barred owl site occupancy rates; (4) quantifies spatiotemporal patterns of barred owl recolonization; and (5) characterizes barred owl dispersal into and within the Sierra Nevada. This project takes place primarily in the northern and central Sierra Nevada, including Lassen National Forest, Lassen National Park, Plumas National Forest, Tahoe National Forest, Eldorado National Forest, Yosemite National Park, and Sequoia-Kings Canyon National Park.

Additionally, on July 22, 2022, the Service published in the *Federal Register* (87 FR 43886) a notice of intent to prepare an environmental impact statement, initiating a 30-day public scoping period seeking input on barred owl management in the northern spotted owl's and California spotted owl's ranges. Preventative barred owl management for California spotted owls will likely be considered in the environmental impact

statement. Northern spotted owls are the main focus right now, but barred owls have expanded into northern California into the California spotted owl's range and are expected to continue to expand without continued management.

Currently, two HCPs include the California spotted owl. Habitat conservation plans are planning documents required as part of an application for an incidental take permit; they can apply to both listed and non-listed species, including those that are candidates or have been proposed for listing. They describe the anticipated effects of the proposed taking; how those impacts will be minimized or mitigated to the maximum extent practicable; and how the HCP is to be funded.

Sierra Pacific Industries is the largest private forest land owner in California, with approximately 744,621 ha (1,840,000 ac) of timberland in northern California (SPI 2021, p. 1). Sierra Pacific Industries' habitat conservation plan for both the northern spotted owl and California spotted owl covers all areas on SPI-managed property where covered activities will occur within the range of the two spotted owl subspecies, which is more than 607,028 ha (1,500,000 ac) (SPI 2021, p. 2). Covered activities under the HCP include timber operations and other forest management activities. Major activities associated with the HCP include growing, harvesting, and transporting timber; timber stand regeneration and improvements; road and landing construction and maintenance; fuel break construction and maintenance; and monitoring and research (including for spotted owls) (Service 2020, p. 8). Implementation of the HCP is not expected to result in direct injury or mortality of California spotted owls due to the implementation of conservation measures that will be implemented throughout the 50-year permit term. These measures will support California spotted owl species needs and address threats currently affecting the species, including reducing the risk of catastrophic fire and eradication of illegal marijuana plantations (Service 2020, pp. 10–13).

In 2015, SPI began studying barred owls via removal experiments. In 2018, the study was revised to include the following objectives: (1) assess the genetic differentiation of barred owl populations across northern and central California, (2) analyze allele frequency changes on the front of the range expansion, (3) estimate the amount of spotted owl-barred owl interbreeding (admixture) in each population, and (4) identify what barred owls are preying on in California. These efforts are ongoing, and SPI has committed to continue these efforts during the term of the permit, as feasible. Ongoing research and monitoring efforts for California spotted owls on SPI land have indicated that some California spotted owl populations in mixed-ownership landscapes have higher occupancy, density, and probability of reproduction compared to California spotted owl populations on public land (Roberts et al. 2017, p. 113; Hobart et al. 2019, p. 198; SPI et al. 2022, pp. 9, 17).

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is one of the largest habitat conservation plans in the United States, covering 202,343 ha (500,000 ac). The California spotted owl is currently listed as a "species not adequately conserved" under the MSHCP until an MOU is executed with the USFS that addresses management of California spotted owls on USFS lands. The MSHCP plan area includes 21,901 ha (54,119 ac) of modeled habitat for California spotted owls. If the MOU with the USFS is signed, the loss of 5,223 ha (12,905 ac) (24 percent) of this modeled habitat is anticipated over the 75-year permit term. With the low density of California spotted owls in the plan area, loss of these 5,223 ha (12,905 ac) is not anticipated to result in direct mortality of adult birds. However, loss of foraging and nesting habitats to development will cause California spotted owls in impacted areas to disperse in search of other habitats. Thus, loss of breeding and foraging habitat may impact overall population numbers of California spotted owls within the plan area over the long term by reducing the number of areas suitable for use as foraging and nesting

sites (Service 2004, p. 449). In order to offset these impacts, the MSHCP will conserve and manage 535 ha (1,321 ac) (2 percent) of modeled habitat for California spotted owls within additional reserve lands. In total, 16,679 ha (41,214 ac) (76 percent) of the modeled habitat for California spotted owls will be included in the MSHCP conservation area. If the MOU with the USFS is signed, additional monitoring and management would occur in habitat for California spotted owls within USFS lands included in the MSHCP conservation area.

Combined Impacts of Threats

The threats discussed above not only act independently, but also interact with each other. It is important to assess the relationship between threats because there may be new or exacerbated impacts that are not considered when a threat is assessed alone. There are a vast number of ways threats may be interacting with each other, but the SSA report and this proposed rule only focus on what is currently most relevant to the viability of the species.

For example, climate change intensifies the threats of large-scale, high-severity fire; drought; and tree mortality, and it increases interannual climate variability (Kadir et al. 2013, pp. 132, 137; Stephens et al. 2018, p. 77). Development in wildland-urban interfaces also increases the likelihood of large-scale, high-severity fire (Mann et al. 2016, pp. 14–18). An increase of large-scale, high-severity fires with changing climate conditions can lead to accelerated, fire-facilitated conversion of forest edge to non-forested habitat (Parks et al. 2019, pp. 1, 7). The impacts to the California spotted owl would likely range from direct physiological impacts to indirect habitat and prey impacts. The loss of trees due to high-severity fire, drought, and tree mortality would likely lead to increased salvage logging on the landscape, further reducing California spotted owl habitat. Additionally, the expansion of barred owls outcompeting California spotted owls in combination with timber harvest outside of PACs further worsens the outlook for

habitat availability. Spotted owls living near the wildland-urban interface may be at a higher risk for exposure to anticoagulant rodenticides, as is the case for barred owls and hybrids (Hofstadter et al. 2021, p. 8).

Barred owls are moving south into the California spotted owl's range, so the northern portion of the Sierra Nevada DPS will likely experience a greater magnitude of this threat, and earlier in time. Tree mortality is more concentrated in the Sierra Nevada DPS than other parts of the landscape and may experience more significant impacts from this threat. The threat of wildfire is of higher magnitude in the Coastal-Southern California DPS. Considering the temporal, spatial, and interactive components of all the threats together is important for understanding the viability of California spotted owls throughout their range now and into the future.

*Current Condition*

For our current condition analysis in the SSA report and this proposed rule, we considered the status of the two populations of California spotted owls: the Sierra Nevada population and the coastal-southern California population. As described above in **Background**, to analyze these populations in more detail, we further divided them into analysis units; however, we recognize that these units do not function independently, and in areas where the species' distribution is continuous, like the Sierra Nevada population, impacts to one unit may result in impacts to an adjacent unit. We assessed the condition of all California spotted owls' ecological needs where information was available for each analysis unit, including the demographic factors of survival, fecundity, occupancy, and population growth, and habitat components of large trees and canopy cover. In addition, because high-severity fire has significant effects on the condition of habitat within an analysis unit, we also incorporated results from our fire analysis. For each population, we present an overview of the available information on ecological conditions and threats across the entire population, our analysis of the demographic factors and habitat

components within each analysis unit to determine current condition, and a summary assessing population resiliency. In this proposed rule, for each DPS, we then assess California spotted owl redundancy and representation under the current condition analysis.

For detailed information on how we determined all demographic and habitat scores, total scores for each population and analysis unit, and uncertainties considered in the analysis, please see the SSA report (Service 2022, pp. 70–77).

Sierra Nevada DPS Current Resiliency

Resiliency is the ability of a species to withstand stochastic events, the normal year-to-year variations in both environmental conditions and demographic conditions (Redford et al. 2011, p. 40). Determined by the size and growth rate of the populations comprising the species, resiliency can be evaluated to gauge the ability of a species to weather the natural range of favorable and unfavorable conditions.

Until recently, California spotted owls and suitable habitat were relatively well-distributed in the Sierra Nevada with few barriers to dispersal (Gutiérrez et al. 2017, p. 94): as of 2017, an estimated 1.98 million ha (4.9 million ac) of suitable habitat for California spotted owls were available in the Sierra Nevada, primarily on Federal lands (Gutiérrez et al. 2017, pp. xx, 123). Of that land, 75 percent is managed by the USFS, 7 percent is managed by the NPS, and 18 percent is either privately owned or managed by other government agencies (Gutiérrez et al. 2017, p. xx). However, recent large, catastrophic fires have reduced available habitat and have likely created new barriers for California spotted owl dispersal in this DPS. Other barriers to dispersal include urban and suburban development, large reservoirs, physiographic features such as non-forested or unsuitable habitat or vegetation communities, or lack of riparian areas to act as corridors through unsuitable extents (Gutiérrez et al. 2017, pp. 94–95, 253–254).

From our habitat analyses, we found that the Sierra Nevada has higher canopy cover and tree size values than southern California (Service 2022, tables 5, 9, and 13). When comparing the northern to the southern Sierra Nevada, the north contains higher canopy cover, which aligns with historical forest structure data that tend to show more dense forests in the northern Sierra Nevada (Van Wagtendonk et al. 2006, p. 250), with the exception being on the east side of the Sierra Nevada (Humboldt-Toiyabe and Inyo analysis units), which contains more open and disjunct habitat than the west side. Higher canopy cover combined with higher precipitation levels tend to result in lower tree mortality in the northern Sierra Nevada, which may have helped reduce the potential for megafires in the northern Sierra Nevada in past years, but climate change impacts of reduced snowpack and increased temperatures show that increased fire risk is also occurring in the northern Sierra Nevada. We also found that the two units mostly composed of National Parks (Yosemite and Sequoia-Kings Canyon) contain the largest tree size percentages. Overall, the overlap values between canopy cover and large trees were low across all analysis units (Service 2022, table 9).

The threats that are currently impacting the Sierra Nevada population include large-scale, high-severity fire; tree mortality; drought; climate change; various impacts from fuels reductions and forest management; competition with barred owls; and rodenticides. These threats are not equivalent across all analysis units within the Sierra Nevada population (Service 2022, pp. 77–87). For example, competition with barred owls is more pronounced in the northern part of this population than in the southern portion, and the threat from rodenticides is more pronounced at the wildlife-urban interface. However, some threats, like fire, are considered a threat across the population, and there is a general increasing trend in the annual acreage and relative proportion of high-severity fires in the Sierra Nevada (Keane in litt. 2022, p. 3). In 2020–2021, the percent of habitat that burned at high severity within California spotted owl PACs in the

Sierra Nevada was almost twice as that from 1993–2019; in 1993–2019, 44 percent of habitat burned, with 35 percent of that at high severity, compared to 65 percent of fire being high severity in 2020–2021 (Keane in litt. 2022, p. 5).

We conducted a separate fire analysis for the entire California spotted owl's range, which includes PACs as well as additional acreage outside PACs (Service 2022, pp. 29–30, appendix I). Our fire analysis shows similar results, with approximately 42 percent of the California spotted owl's range in the Sierra Nevada burned between 1984 and 2021, with 7 percent and 12 percent of that total from acreages burned in 2020 and 2021, respectively. Of the 42 percent of California spotted owl's range burned within the Sierra Nevada, approximately 13 percent was burned at high severity (Service 2022, appendix I). In our supplemental analysis that analyzes habitat and fire metrics along an ecological boundary between the northern and southern Sierra Nevada, we found that both portions of the Sierra Nevada burned at similar amounts between 1984 and 2021 (Service 2022, appendix I). However, the majority of burned acreage in the northern Sierra Nevada occurred in 2021 (18 percent burned with 9 percent at high severity compared to 5 percent or less in all other years and 2 percent or less at high severity from 1984 to 2021). In the southern Sierra Nevada, 11 percent burned in 2020 with 2 percent at high severity in 2020 and 2021, compared to 5 percent or less total burned and 1 percent or less at high severity from 1984 to 2021 (Service 2022, appendix I). These results suggest higher levels of disturbance to the species and increased recovery time for habitat conditions to improve post-fire because such a large acreage burned over a relatively concentrated period of time.

In addition to common threats acting on all analysis units within this population, there are also common management actions taking place within the Sierra Nevada population. For example, the USFS designates PACs around known California spotted owl nest trees, so analysis units containing national forests (e.g., all Sierra Nevada

population analysis units except for Yosemite and Sequoia-Kings Canyon) include these protections. Further, barred owl removal experiments in the northern Sierra Nevada have so far been successful in avoiding the catastrophic impacts that could have occurred in the absence of any management.

The current condition of analysis units throughout the Sierra Nevada population varies, with three analysis units currently considered stable, five declining, and three strongly declining (Service 2022, table 12). All three of the units ranked as strongly declining are on the upper boundary of our scoring system for the SSA report. Based on these results, the overall condition of the Sierra Nevada population is declining and, therefore, has low resiliency. However, though resiliency has declined from historical conditions and connectivity has decreased, the Sierra Nevada population is still distributed throughout its historical range, and ongoing conservation measures and regulatory mechanisms are decreasing the magnitude of threats. Therefore, the Sierra Nevada population maintains the ability to withstand stochastic events.

Sierra Nevada DPS Current Redundancy

To assess current redundancy of the Sierra Nevada DPS, we consider the ability of a species to withstand catastrophic events, i.e., natural or anthropogenic stochastic events that would result in the loss of a substantial component of the overall species population. However, redundancy is not simply a measure of the total number of individuals or populations of a species, but instead must also be evaluated in the context of an assessment of reasonably plausible catastrophic events. For example, when we consider the redundancy of an entity comprised of a single population that is very large and widely distributed, it could have a high ability to withstand a catastrophic event that would only affect a small percentage of the overall population. Therefore, our characterization of the Sierra Nevada DPS's redundancy takes into consideration both an assessment of the size and distribution of its population, and an evaluation of the kinds

and likelihood of reasonably plausible catastrophic events to which the species could be exposed.

Of the two populations throughout the species' range, the Sierra Nevada population that makes up the Sierra Nevada DPS covers the most area and is the largest population. Catastrophic events that could impact California spotted owls include very large, high-severity wildfire; extreme drought; extreme weather events; and prolonged and persistent competition and displacement due to barred owl expansion. Overall, current California spotted owl redundancy has declined from historical condition, which risks making the species more vulnerable to extirpations from catastrophic events. However, the Sierra Nevada DPS is large, contiguous, and still distributed throughout its historical range, meaning it is more able to recover from events such large, catastrophic wildfires.

Sierra Nevada DPS Current Representation

In this proposed rule, to assess current representation, which is the California spotted owl's current ability to adapt to change, we considered the ecological setting and genetic diversity in the Sierra Nevada DPS. In the Sierra Nevada population, a majority of California spotted owls occur within mid-elevation ponderosa pine, mixed-conifer, white fir, and mixed-evergreen forest types, with few California spotted owls occurring in the lower elevation oak woodlands of the western foothills (Gutiérrez et al. 2017, p. xix). Further, California spotted owls in the northern portion of the Sierra Nevadas tend to have larger home range sizes than California spotted owls in the southern portion of the mountain range (Gutiérrez et al. 2017, p. xviii). Within the Sierra Nevada, the northern portion of the range experiences more precipitation and lower mean temperatures than the southern portion of the range (Climate Engine 2017, unpaginated). The diversity in habitat and climate between and within the areas for which we have data suggests that the species has some flexibility to adapt to changing environmental conditions.

Of the three spotted owl subspecies (northern, California, and Mexican), California spotted owls have the lowest genetic diversity when measured by unique haplotypes (Barrowclough et al. 1999, pp. 919, 927; Haig et al. 2004, p. 683). This suggests that California spotted owls have lower genetic representation in general than either of the other two subspecies. However, whether the observed level of genetic diversity indicates low representation is unclear. Because the California spotted owl has persisted throughout much of its historical range for an extended period of time, the relatively low genetic diversity may be an historical artifact rather than an indication of concern for representation. Within the California spotted owl subspecies, genetic differences are found between California spotted owls found in the Sierra Nevada and those found in coastal-southern California; this provides some degree of genetic representation at the subspecies level, although not enough for each population to be considered a separate subspecies (Barrowclough et al. 1999, p. 927; Gutiérrez et al. 2017, p. 101; Hanna et al. 2018, pp. 3946–3947, 3949). Whole-genome data indicate that there is greater genetic difference between California spotted owls (in the northern and southern extent of the subspecies' range) than there is between northern spotted owls and California spotted owls in the northern portion of the range; this is consistent with isolation-by-distance (geographic differences increase with geographic scale) (Hanna et al. 2018, pp. 3946–3947). The genetic differences observed between populations, as well as the habitat and climate differences, may represent a moderate degree of adaptation and thus moderate representation at the subspecies level.

Though the Sierra Nevada DPS has lower representation than the subspecies as a whole, the California spotted owl continues to inhabit different ecological settings throughout the Sierra Nevada. The overall condition of the DPS has declined, which has likely resulted in reduced genetic diversity. Therefore, current California spotted owl

representation in the Sierra Nevada DPS has declined from historical condition, suggesting that the ability for the taxon to adapt to change is decreased.

Coastal-Southern California DPS Current Resiliency

Habitat within the Coastal-Southern DPS is considered to be naturally fragmented, with little dispersal occurring between subpopulations due to discontinuous mountain ranges (Gutiérrez et al. 2017, pp. 93–95). This natural fragmentation has been further fragmented by development/habitat loss in the greater southern California area. Specific information about habitat and demographic conditions, when available, is incorporated below for each of our southern California analysis units. The available evidence does not document successful dispersal between the San Bernardino, San Gabriel, and San Jacinto Mountains, which are adjacent mountain ranges, indicating that if dispersal does occur within this population, it is very rare (LaHaye et al. 2001, entire; LaHaye et al. 2004, entire; Gutiérrez et al. 2017, pp. 242, 250).

As previously discussed, within this population, occupancy data are only available for the San Bernardino Mountains. The San Bernardino Mountains have historically contained the largest number of California spotted owls, suggesting that information extrapolated from this area would lead to a too optimistic view for the overall population (Gutiérrez et al. 2017, p. 242). Data from one recent study showed higher occupancy in the San Bernardino Mountains than the San Jacinto and San Gabriel Mountains, and the authors suggest that other parts of southern California may also have experienced greater declines than this area (Tempel et al. 2022, pp. 20–21).

As mentioned for the Sierra Nevada population, our habitat analyses found that habitat values for large trees and canopy cover were lower in southern California than in the Sierra Nevada (Service 2022, tables 5, 9, and 13). Overlap between canopy cover and large trees was also low (Service 2022, table 13). In southern California, high canopy cover is positively associated with California spotted owl reproductive output, but large

trees appeared to be more important than high canopy cover (Tempel et al. 2022, p. 22) and are also important for occupancy. Our analysis found large tree values for southern California are low, which may indicate lower habitat quality in this analysis unit. For this population, we conducted an additional analysis identifying the percentage of small trees within the overall population that could potentially support platform or stick nests (Service 2022, table 14). We found that 14 percent of the coastal-southern California analysis units contain these small trees compared to an overall value of 1 percent for large trees only trees larger than 61 cm dbh are considered. When looking at the combined total of small trees and large trees, 16 percent of southern California contains potential trees that could support the California spotted owl's ecological needs (Service 2022, table 14).

The threats that are likely currently impacting this population include large-scale, high-severity fire; tree mortality; drought; climate change; various impacts from fuels reductions and forest management; and rodenticides. Competition with barred owls is not yet considered a current threat within this population. Impacts from these threats may not be equally distributed across the population and are not equivalent to the ways that these threats impact the Sierra Nevada population. For example, what might be considered a stochastic event (in this case, an event that removes one or a few individuals from the population) in the Sierra Nevada population could instead be considered catastrophic if it were to occur in the coastal-southern California population because of the lower number of California spotted owls within this population. Our fire analysis shows that 60 percent of the California spotted owl's range in southern California burned between 1984 and 2021, 17 percent at high severity, with 6 percent of the total area burned in 2020 and 1 percent at high severity that year. There were no fires in 2021 within the range of this population. Typically, 4 percent or less of habitat within this population burned per year, with 1 percent or less burning at high severity, although some years burned at higher

percentages (2003 at 6 percent with 3 percent high severity, and 2007 at 8 percent with 4 percent high severity; Service 2022, appendix I). In addition to common threats acting on all analysis units within this population, there are also common management actions taking place throughout the analysis units comprising the coastal-southern California population. For example, analysis units containing national forests include PACs around known California spotted owl nest trees.

The current condition of analysis units within the Coastal-Southern California DPS is that two analysis units are strongly declining and two units are declining (Service 2022, table 17). Based on these results and our scoring of habitat conditions and available demographic information (Service 2022, table 18), the overall condition of the Coastal-Southern California DPS is strongly declining and, therefore, has very low resiliency.

Coastal-Southern California DPS Current Redundancy

As with the Sierra Nevada DPS, our characterization of redundancy for the Coastal-Southern California DPS takes into consideration both an assessment of the size and distribution of its population, and an evaluation of the kinds and likelihood of reasonably plausible catastrophic events to which the species could be exposed.

As with the Sierra Nevada DPS, catastrophic events that could impact the Coastal-Southern California DPS include very large, high-severity wildfire; extreme drought; extreme weather events; and prolonged and persistent competition and displacement due to barred owl expansion. The population that makes up the Coastal-Southern California DPS is highly fragmented with gaps between occupied areas. In areas where demographic data are available (the San Bernardino analysis unit), declines have accelerated over the last 30 years, and as stated above, information extrapolated from a study area that historically contained the largest number of California spotted owls could lead to an overly optimistic view for other areas of the coastal-southern California population(Gutiérrez et al. 2017, p. 242). Overall, current California spotted owl

redundancy in this DPS has declined from historical condition, making the species more vulnerable to extirpations and potentially extinction from catastrophic events.

Coastal-Southern California DPS Current Representation

To assess current representation, which is the California spotted owl's current ability to adapt to change, we considered the ecological setting and genetic diversity among the two California spotted owl populations. In coastal and southern California, California spotted owls are found in riparian/hardwood forests and woodlands, live oak/big cone fir forests, and redwood/California laurel forests (Gutiérrez et al. 2017, p. xxvi). California spotted owls use stick nests more frequently in southern California compared to in the Sierra Nevada. Further, California spotted owls in the northern portion of the range tend to have larger home range sizes than California spotted owls in the southern portion of the range (Gutiérrez et al. 2017, p. xviii). The climate of the Coastal-Southern California DPS is more arid than that of the Sierra Nevada (Climate Engine 2017, unpaginated).

In regard to genetic diversity, in the Coastal-Southern California DPS, the population has become highly fragmented, which likely has resulted in reduced genetic diversity. The increased fragmentation has reduced the amount of available habitat in throughout the coastal-southern California population. Therefore, current California spotted owl representation in the costal-southern California population has declined from historical condition, suggesting that the ability for the DPS to adapt to change is decreased.

*Future Condition*

For our future condition analysis, we forecast the response of the Sierra Nevada DPS of the California spotted owl to two plausible future scenarios. These two scenarios represent the extremes of a range of future changes in environmental conditions and success of implemented conservation efforts. The future scenarios project the influences

to viability discussed above in *Current Condition* into the future and consider the impacts those influences would potentially have on California spotted owl viability. We apply the concepts of resiliency, redundancy, and representation to the future scenarios to describe the future viability of California spotted owls in the Sierra Nevada DPS.

For this analysis, we describe two future scenarios and assess future resiliency for the Sierra Nevada DPS. Scenario 1 assesses future viability with an increase in the trend and magnitude of threats with implemented management efforts having mixed success. Scenario 2 assesses the viability of the species if the trend and magnitude of threats were to continue at the current trajectory into the future with implemented management efforts being fully successful. A full comparison of the assumptions made for each scenario is available in the SSA report (Service 2022, table 19). Using two scenarios representing the extremes of plausible future projections for the species allows us to consider the full range of future possibilities for predicting the future viability of the Sierra Nevada DPS and incorporates any uncertainty regarding the impact of future environmental conditions and the success of implemented conservation efforts. For the SSA report and this proposed rule, we assessed future conditions at approximately 40–50 years. For a detailed description of our methods and assumptions for each future scenario, as well as more details on how the impacts of threats would differ under each scenario, please see the SSA report (Service 2022, pp. 97–100).

In the SSA report, we also applied our two future scenarios to the population of California spotted owls that makes up the Coastal-Southern California DPS. Because we determined that the current condition of the Coastal-Southern California DPS is consistent with an endangered species (see *Status of the Coastal-Southern California DPS of the California Spotted Owl Throughout All of Its Range*, below), we are not presenting the results of the future scenarios in this proposed rule. Please refer to the SSA report (Service 2022, pp. 100–125) for the full analysis of future scenarios.

Scenario 1

Scenario 1 considers viability of the Sierra Nevada DPS if some of the significant threats were to increase in magnitude into the future and future management efforts have mixed success in addressing those threats. Under this scenario, climate change models under RCP 8.5 project temperature increases of 4.5–6 °F, depending on the portion of the range. Increases in temperatures will likely increase extreme weather events, including heat waves and drought conditions (Kadir et al. 2013, pp. 38, 48). With increased drought conditions, tree mortality and large-scale, high-severity fire are likely to increase in frequency and size, especially if fuel loads in forests are not decreased (Westerling and Bryant 2008, pp. S244–S248; Abatzoglou and Williams 2016, pp. 11770, 11773; Young et al. 2017, p. 78). Extreme weather events or significant changes in interannual climate variability may have negative impacts on the California spotted owl's survival and reproduction. Although there are some protections in place for California spotted owls on public lands, timber harvest values can vary year to year. Therefore, it is possible that increases in timber harvest targets may reduce California spotted owl habitat that is available now or that may be available in the future for California spotted owls to establish new territories and disperse beyond the PACs.

Without continued ongoing experimental removals, barred owls will likely continue to expand their range into California spotted owl habitat, eventually reaching a point of exponential increase and significantly displacing and outcompeting California spotted owls on the landscape (Keane et al. 2018, pp. 8, 47). The timeline for barred owl expansion and replacement of California spotted owls on the landscape is unknown; however, because they were able to expand so quickly within the northern spotted owl's range, under future scenario 1 we assume barred owls would move beyond the Sierra Nevada and continue to expand into southern California. This expansion could be due to current experimental removal efforts becoming less successful over time (i.e., decreased

experimental removal efforts) or the barred owl being able to cross what was thought to be unsuitable habitat, like the Central Valley. Under scenario 1, it is also possible that rodenticide use could continue to increase in California due to the legalization of marijuana in 2016. There will likely continue to be an increase in demand for marijuana, which may increase illegal grow sites using anticoagulant rodenticides in California if the costs of buying land and acquiring/maintaining permits to legalize a grow operation are too high (Soboroff and Koss 2017, entire; Yakowicz 2018, entire; Harrison 2018, entire). In regards to disease and parasites, there is evidence that changing climate conditions could increase pathogen development and occurrence (Harvell et al. 2002, p. 2158), creating a slight chance that disease and parasites may become a more significant issue in the future. Finally, development may continue to encroach upon California spotted owl habitat as the California human population continues to grow (California Economic Forecast 2016, pp. xii–xiii, 233–236).

Under scenario 1, almost all analysis units degrade in condition, with four analysis units considered declining, four strongly declining, and three that will likely be extirpated (Service 2022, tables 20 and 22). Two of the units that will likely be extirpated under scenario 1 are currently small, peripheral units. Based on these results, under scenario 1 the future overall condition of the Sierra Nevada population will be strongly declining (average overall future condition score of 0.82). Therefore, the Sierra Nevada population has very low resiliency under future scenario 1.

Scenario 2

Scenario 2 considers a future where the threats continue at the current trajectory and ongoing management efforts are successful at addressing those threats. Under this scenario, climate change models under RCP 4.5 project temperature increases of 3.5–5 °F, depending on the portion of the range. Under future scenario 2, drought conditions, tree mortality events, and high-severity fire will likely continue at the current trajectory.

Currently, there are research actions in place to experimentally limit barred owl expansion within study areas, which have so far been successful and which we project will continue to be successful in limiting the barred owl's expansion under this scenario. Protections would continue to stay in place for California spotted owls on public lands, and timber harvest would remain at reduced levels on public lands. Rodenticide use would either remain the same or decrease due to continued law enforcement activity shutting down illegal marijuana grows. Under scenario 2, the current rate of human population growth will continue, leading to steadily increasing development, specifically in areas that are not on public land.

As in future scenario 1, under future scenario 2, large-scale, high-severity fire will likely impact a majority of the California spotted owl's ecological needs, with negative impacts to prey, large trees, habitat heterogeneity, and available nest trees, and there may be some increase in California spotted owl mortality. With a reduction in some of the key habitat components due to large-scale, high-severity fires, fecundity, occupancy, and population growth will likely decline under future scenario 2.

Under scenario 2, most analysis units degrade in condition, but some maintain their current condition. Overall, under scenario 2, we project the Sierra Nevada population will have four analysis units declining, five strongly declining, and two that will likely be extirpated (Service 2022, table 24). Based on these results, under scenario 2, the future condition of the Sierra Nevada population will be strongly declining, but to a lesser degree than under scenario 1. Therefore, the Sierra Nevada DPS has very low resiliency under future scenario 2.

Future Redundancy

Under future scenario 1, we anticipate the population that makes up the Sierra Nevada DPS would be less resilient compared to current condition. The California spotted owl will likely maintain a wide distribution throughout the Sierra Nevada;

however, the conditions of all analysis units within the Sierra Nevada population are declining, with over half the analysis units projected to be strongly declining or extirpated. Therefore, under scenario 1, redundancy would decline compared to the current condition, as the species would be less likely to be able to withstand catastrophic events with only one population with very low resiliency.

Under future scenario 2, the Sierra Nevada DPS would be less resilient compared to the current condition. The California spotted owl will likely maintain a majority of its current distribution throughout the Sierra Nevada. Overall, the DPS would be less likely to be able to withstand catastrophic events, with its population losing resiliency and a majority of analysis units declining or strongly declining with the potential to be extirpated under scenario 2. For species redundancy, the outcome of scenario 1 and scenario 2 are very similar after 40–50 years. There are differences in how quickly the population would decrease in condition, the likelihood of the impacts, and how many analysis units within a population may actually become extirpated. It is more likely that redundancy would be reduced, potentially from a catastrophic event, under scenario 1.

Future Representation

Predictions for future scenario 1 are that many of the habitat components identified for California spotted owls will likely have a limited ability to withstand predicted changes and are likely to further decline in condition in the future. This would indirectly cause a decrease in representation for the Sierra Nevada DPS if the current degree of diversity in habitat and climate declines. Further, with continued declines in occupancy, fecundity, and survival, population growth will decline and will likely further reduce genetic diversity. Under scenario 1, representation would decline compared to current condition as the species would have less flexibility to adapt to changing environmental conditions.

Under Scenario 2, most analysis units degrade in condition, but some maintain their current condition. Overall, under scenario 2 we project the Sierra Nevada population will have seven analysis units declining and four strongly declining (Service 2022, table 24). Based on these results, under scenario 2 the future condition of the Sierra Nevada population will be strongly declining (average overall future condition score of 1.9), but to a lesser degree than under scenario 1. An overall future condition score of 1.9 is at the very upper limit of our scoring boundary for a strongly declining population condition (Service 2022, tables 4 and 7). Therefore, the Sierra Nevada population has very low resiliency under future scenario 2, but it is closer to the boundary of low resiliency.

**Table 1. Analysis Unit Current and Future Condition Comparisons (changes from current condition in bold).**

| Analysis Unit | Current Condition | Future Condition Scenario 1 | Future Condition Scenario 2 |
|---|---|---|---|
| Sierra Nevada Population | | | |
| Lassen | Declining | **Strongly declining** | **Strongly declining** |
| Plumas | Declining | **Strongly declining** | Declining |
| Tahoe | Stable | **Declining** | **Declining** |
| Eldorado | Declining | **Strongly declining** | Declining |
| Humboldt-Toiyabe | Strongly declining | **Extirpated** | Strongly Declining |
| Stanislaus | Declining | Declining | Declining |
| Yosemite | Stable | **Declining** | **Declining** |
| Sierra | Declining | Declining | **Strongly declining** |
| Sequoia-Kings Canyon | Stable | **Strongly declining** | **Declining** |
| Sequoia | Strongly declining | **Extirpated** | Strongly declining |
| Inyo | Strongly declining | **Extirpated** | Strongly declining |

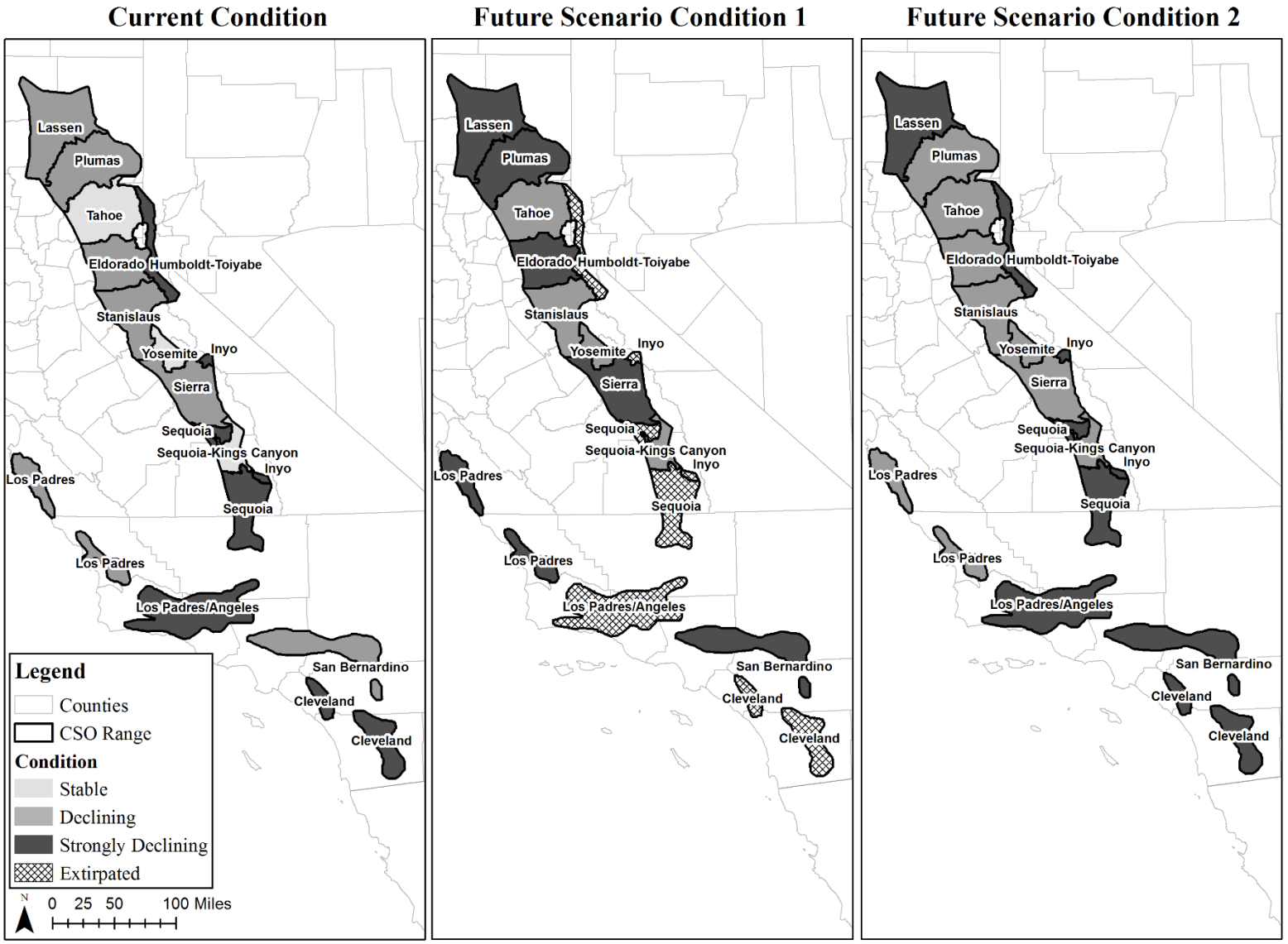


FIGURE 2—CONDITION OF CALIFORNIA SPOTTED OWL (CSO) ANALYSIS UNITS UNDER CURRENT AND FUTURE SCENARIOS.

**Determination of California Spotted Owl'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 of the Sierra Nevada DPS of the California Spotted Owl Throughout All of Its Range*

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Sierra Nevada DPS of the California spotted owl and its habitat. In this proposed rule, we present summary evaluations of eight threats analyzed in the SSA report for the California spotted owl: wildfire (Factor A), tree mortality (Factor A), drought (Factor A), climate change (Factor A), fuels reduction and forest management (Factor A), competition and hybridization with barred owls (Factor E), rodenticides (Factor E), and development (Factor A), as well as the combined effects of those threats. We also evaluated existing regulatory mechanisms (Factor D) and ongoing conservation measures.

In the SSA, we also considered four additional threats: Overutilization due to recreational, educational, and scientific use (Factor B); disease (Factor C); predation

(Factor C); and recreation (Factor E). We concluded that, as indicated by the best available scientific and commercial information, these threats are currently having little to no impact on the California spotted owl, and thus their overall effect now and into the future is expected to be minimal. However, we consider them in this determination, because although these minor threats may have low impacts on their own, combined with impacts of other threats, they could further reduce the number of California spotted owls. For full descriptions of all threats and how they impact the species, please see the SSA report (Service 2022, pp. 25–68).

The California spotted owl needs an adequate amount of nesting, foraging, and roosting habitat to be successful, and requires the components of canopy cover, larger trees, and habitat heterogeneity. Over the last several decades, impacts from wildfire (Factor A), tree mortality (Factor A), and some forest management practices (Factor A), particularly the historical effects of clearcutting, have reduced the amount of forest with these habitat needs. Historical fire suppression has also contributed to the current increase in high-severity fire across the range of the Sierra Nevada DPS of the California spotted owl.

High-severity wildfire is one of the most significant threats currently affecting the California spotted owl and its habitat, including the Sierra Nevada DPS. The Sierra Nevada DPS occurs within a very high wildfire threat category. Approximately 47 percent of the California spotted owl's range burned between 1984 and 2021, with 15 percent burned at high severity. Most of the area burned at high severity occurred in 2020 and 2021. In the Sierra Nevada DPS specifically, over 1,000,000 ha (2,500,000 ac) burned between 1984–2019, with 317,605 ha (784,820 ac) burned at high severity (Keane in litt. 2022, p. 3). Areas burned at high fire severity can take decades to recover. Based on fire activity data from 2000 through 2014, the cumulative amount of fire burned at high severity within the next 75 years could exceed total existing habitat in the Sierra

Nevada, such that the loss of suitable habitat may exceed the rate of new habitat growing post-fire (Stephens et al. 2016, pp. 1, 11–13). Although important actions are being taken by the USFS and its partners, particularly through the recent Fire MOUs to reduce the scope and magnitude of wildfires, this magnitude of the threat of wildfire is expected to continue into the foreseeable future.

Under the current condition, 3 of the 11 Sierra Nevada analysis units are in stable condition, 5 analysis units are declining, and 3 analysis units are strongly declining. Based on recent demographic information and our habitat analysis, we found the current resiliency of the Sierra Nevada population is very low. Overall, the subspecies' current redundancy has decreased from historical condition. Although the species is currently distributed throughout its historical range within the Sierra Nevada, the condition of most analysis units is currently declining, reducing the species' ability to withstand catastrophic events. However, the subspecies maintains suitable habitat condition and retains habitat needs, particularly throughout the Sierra Nevada. Additionally, conservation efforts and regulatory mechanisms are decreasing the magnitude of effects from threats, including experimental removals of barred owls.

Effects from the threats described above are anticipated to increase into the foreseeable future, particularly drought and climate change (Factor A). Climate models project increased temperatures and more frequent drought in the Sierra Nevada DPS, with temperature increases projected to increase between 4–6 ºF in the next 40 years. Climate projections also forecast snow moving to higher elevations, as well as more extreme precipitation and drought events. Overall increases in drought will increase tree mortality and the risk of high-severity fire. Invasions by barred owls (Factor E) are projected to continue into the foreseeable future and may outpace experimental removal efforts. In both our future scenarios, analysis units within the range of the Sierra Nevada DPS will be either strongly declining or extirpated due to the combined effects of all threats.

Overall, redundancy and representation would decline as conditions degrade throughout the range and population resiliency declines, reducing the species' ability to withstand catastrophic events and adapt to changing environmental conditions.

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that the Sierra Nevada DPS is facing threats associated with high-severity fire, tree mortality, drought and climate change, rodenticides, and barred owls. Although it is declining in some parts of the DPS, the Sierra Nevada DPS currently retains resiliency, redundancy, and representation. Thus, it is not in danger of extinction now throughout all of its range. However, the threats of wildfire, climate change, and barred owls are anticipated to increase into the foreseeable future, and even in the more optimistic of the plausible future scenarios, habitat is still projected to severely decline, and we project that many parts of the range may become extirpated. Thus, after assessing the best available information, we conclude that the Sierra Nevada DPS is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

*Status of the Sierra Nevada DPS of the California Spotted Owl Throughout a Significant Portion of Its Range*

We evaluated the range of the Sierra Nevada DPS of the California spotted owl to determine if the DPS is in danger of extinction now in any portion of its range. The range can theoretically be divided into portions in an infinite number of ways. We focused our analysis on portions of the range that may meet the definition of an endangered species. For the Sierra Nevada DPS, we considered whether the threats or their effects on the DPS are greater in any biologically meaningful portion of the range than in other portions such that the DPS is in danger of extinction now in that portion.

The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction; an endangered

species is in danger of extinction now while a threatened species is not in danger of extinction now but is likely to become so in the foreseeable future. Thus, we reviewed the best scientific and commercial data available regarding the time horizon for the threats that are driving the Sierra Nevada DPS of the California spotted owl to warrant listing as a threatened species throughout all of its range. We then considered whether these threats or their effects are occurring (or may imminently occur) in any portion of the range with sufficient magnitude such that the DPS is in danger of extinction now in that portion of its range. We examined the following threats: wildfire (Factor A); tree mortality (Factor A); drought (Factor A); climate change (Factor A); fuels reduction and forest management (Factor A); competition and hybridization with barred owls (Factor E); rodenticides (Factor E); development (Factor A); overutilization due to recreational, educational, and scientific use (Factor B); disease (Factor C); predation (Factor C); and recreation (Factor E), as well as the combined effects of those threats. We also evaluated existing regulatory mechanisms (Factor D) and ongoing conservation measures.

We found a potential difference in biological condition of the DPS in the Humboldt-Toiyabe, Inyo, and Sequoia analysis units (see figure 2, above), where our habitat analysis indicated that they are strongly declining in the current condition.

Our habitat analysis found that the Humboldt-Toiyabe unit has low amounts of suitable habitat for the California spotted owl, and 16 percent of the unit has recently burned. The Inyo unit is a small peripheral area with no recent detections, and habitat is considered degraded. The Sequoia unit has lower values for large trees and canopy cover than many other parts of the Sierra Nevada DPS, and wildfires have burned 60 percent of the unit between 1984 and 2021. We have no evidence that the magnitude of threats is higher in this portion of the range. However, the status of these units is degraded compared to the remainder of the DPS, and they may be in danger of extinction.

We next considered whether or not these three analysis units are significant to the Sierra Nevada DPS. We asked whether this portion of the range (i.e., the Humboldt-Toiyabe, Inyo, and Sequoia analysis unit portions of the Sierra Nevada DPS's range) is significant. The Service's most recent definition of "significant" within agency policy guidance has been invalidated by court order (see *Desert Survivors* v. *U.S. Department of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018)). In undertaking this analysis for the Sierra Nevada DPS, we considered whether these three units may be significant. Therefore, in light of the court decision, for the purposes of this analysis when considering whether this portion is significant, we considered whether the portion may (1) occur in a unique habitat or ecoregion for the species; (2) contain high-quality or high-value habitat relative to the remaining portions of the range, for the species' continued viability in light of the existing threats; (3) contain habitat that is essential to a specific life-history function for the species and that is not found in the other portions (for example, the principal breeding ground for the species); or (4) contain a large geographic portion of the suitable habitat relative to the remaining portions of the range for the species.

Overall, the three units make up approximately 14 percent of habitat in the DPS. There are limited owl detections in these areas, particularly in the Inyo and Humboldt-Toiyabe analysis units; thus, these areas are not contributing significantly to the resiliency of the Sierra Nevada population. The habitat in all three units is degraded. They also do not contain any unique or unusual habitat for the taxon, nor do they contain any habitat essential to any life-history functions that is not found in any other portions. Therefore, these portions do not meet the identified prongs for significance, as outlined above.

We also analyzed the five analysis units in the DPS that are currently in declining condition. In our definition of current condition, this means that these analysis units are

less likely to persist for the next 40–50 years, but are not in danger of extinction now. Limited population data are available for these analysis units. For the Lassen, Sierra, Eldorado, and portions of the Plumas unit, the most recent demography studies found that California spotted owls are declining under both occupancy and mark-recapture models (Tempel and Gutiérrez 2013, pp. 1091–1093; Tempel et al. 2014b, pp. 86, 90–92, Conner et al. 2016, p. 15). Reproductive output has varied in Lassen, Plumas, and Sierra analysis units, and has been declining in the Eldorado unit (Franklin et al. 2004, p. 24; Blakesley et al. 2010, pp. 17–19), Apparent adult survival remained high in all units with demographic data (Blakesley et al. 2010, pp. 12–19; Conner et al. 2016, p. 11). Within the Lassen, Plumas, and Sierra units, new owls (sub-adults and territorial adults) continued to be marked each year over the course of the demography studies (Conner et al. 2016, pp. 3, 7, table 1), indicating recruitment of owls into those areas through local reproduction or dispersal from other areas. Additionally, these units still maintain suitable habitat and species needs such as forest heterogeneity, tall trees, and canopy cover. These five analysis units overall retain contiguous suitable habitat, allowing for dispersal between areas. Because of this, these analysis units can recover from stochastic and catastrophic events, allowing this portion of the population as a whole to withstand threats and allowing potential dispersal or recolonization from surrounding analysis units. Thus, we conclude that these areas are not currently in danger of extinction.

Therefore, we determine that the Sierra Nevada DPS 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 on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered

Species" and "Threatened Species" (Final Policy; 79 FR 37578, July 1, 2014), including the definition of "significant," that those court decisions held to be invalid.

*Status of the Sierra Nevada DPS of the California Spotted Owl*

Our review of the best available scientific and commercial information indicates that the Sierra Nevada DPS meets the Act's definition of a threatened species. Therefore, we propose to list the Sierra Nevada DPS of the California spotted owl as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

*Status of the Coastal-Southern California DPS of the California Spotted Owl Throughout All of Its Range*

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Coastal-Southern California DPS of the California spotted owl and its habitat. In this proposed rule, we present summary evaluations of eight threats analyzed in the SSA report for the California spotted owl: wildfire (Factor A), tree mortality (Factor A), drought (Factor A), climate change (Factor A), fuels reduction and forest management (Factor A), competition and hybridization with barred owls (Factor E), rodenticides (Factor E), and development (Factor A), as well as the combined effects of those threats. We also evaluated existing regulatory mechanisms (Factor D) and ongoing conservation measures.

In the SSA, we also considered four additional threats: Overutilization due to recreational, educational, and scientific use (Factor B); disease (Factor C); predation (Factor C); and recreation (Factor E). We concluded that, as indicated by the best available scientific and commercial information, these threats are currently having little to no impact on the California spotted owl, and thus their overall effect now and into the future is expected to be minimal. As with the Sierra Nevada DPS, we now consider them in this determination, because although these minor threats may have low impacts on their own, combined with impacts of other threats, they could further reduce the number

of California spotted owls. For full descriptions of all threats and how they impact the species, please see the SSA report (Service 2022, pp. 25–68).

In the Coastal-Southern California DPS, impacts from wildfire are at very high magnitude, with all of the DPS considered to be at extreme fire risk. Our fire analysis shows that 60 percent of the range of the Coastal-Southern California DPS burned between 1984 and 2021, including 17 percent at high severity. These high-severity fires in particular are removing the California spotted owl's needs of canopy cover, large trees, and habitat heterogeneity. Given that habitat in the Coastal-Southern California DPS is already fragmented and that there is limited evidence of movement between habitat patches, any habitat burned at high severity is less likely to be able to recover from high-severity fires.

Development has further degraded naturally fragmented habitat in the Coastal-Southern California DPS, and owls in this DPS are affected by ongoing drought conditions and tree mortality. In southern California, there are high development demands with wind farms and large reservoirs impacting connectivity within the California spotted owl's range, and riparian areas used by California spotted owls are being lost to water diversion. These threats are continuing to reduce the California spotted owl's needs of high canopy cover and large trees, both of which are already at low condition. Barred owls are currently only having a limited impact on this DPS.

Limited population data are available for this part of the range, but in the San Bernardino Mountains, occupancy of territories has declined by half (Tempel et al. 2022, pp. 16, 18). Additionally, we were not able to find information about California spotted owls dispersing between mountain ranges in coastal or southern California. The number of owls in this part of the range is low. Therefore, what might be considered a stochastic event in the Sierra Nevada DPS leading to the removal of one or a few individuals from the population could have a much higher impact if it were to occur in the coastal-southern

California DPS. Additionally, due to the highly developed nature of the areas between suitable patches of habitat in coastal and particularly southern California, there is no record of owls dispersing between occupied areas. All four analysis units in this DPS are currently declining.

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that threats associated with wildfire, drought, and tree mortality, as well as the current impacts of climate change, have degraded habitat in the Coastal-Southern California DPS of the California spotted owl, such that most of this part of the range could become extirpated. These threats are impacting the DPS now; thus, this DPS does not meet the Act's definition of a threatened species. Due to the extreme risk of wildfire, degraded habitat conditions, no dispersal between subpopulations, and very low population resiliency and redundancy, we find that the Coastal-Southern California DPS meets the Act's definition of an endangered species. Thus, after assessing the best available information, we determine that Coastal-Southern California DPS of the California spotted owl is in danger of extinction throughout all of its range.

*Status of the Coastal-Southern California DPS of the California Spotted Owl 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 in the foreseeable future throughout all or a significant portion of its range. We have determined that the Coastal-Southern California DPS is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portion of its range. Because the Coastal-Southern California DPS warrants listing as endangered throughout all of its range, our determination does not conflict with the decision in *Center for Biological Diversity* v. *Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020) (*Everson*), which vacated the provision of the

Final Policy (79 FR 37578, July 1, 2014) providing that 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.

*Status of the Coastal-Southern California DPS of the California Spotted Owl*

Our review of the best available scientific and commercial information indicates that the Coastal-Southern DPS of the California spotted owl meets the Act's definition of an endangered species. Therefore, we propose to list the Coastal-Southern California DPS as an endangered species in accordance with sections 3(6) 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, 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 these DPSs are 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 States of California and Nevada would be eligible for Federal funds to implement management actions that promote the protection or recovery of the California spotted owl. 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 Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl are only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for these DPSs. Additionally, we invite you to submit any new information on the California spotted owl whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. 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 a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with the Service.

Examples of actions that may be subject to the section 7 processes are land management or other landscape-altering activities on Federal lands administered by the USFS, BLM, DOD, NPS, and the Service, as well as actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 et seq.) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from 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. Examples of Federal agency actions that may require consultation for the California spotted owl could include forest and fuels management, land management planning, habitat restoration, recreation management, and road maintenance. Given the difference in triggers for conferencing and consultation, Federal agencies should coordinate with the local Service Field Office (see **FOR FURTHER INFORMATION CONTACT**, above) with any specific questions.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any species listed as an endangered species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply

to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. For the Sierra Nevada DPS of the California spotted owl, which we are proposing to list as threatened, the discussion below under **II. Proposed Rule Issued Under Section 4(d) of the Act** regarding protective regulations under section 4(d) of the Act complies with our policy.

We now discuss specific activities related to the Coastal-Southern California DPS, which we are proposing to list as endangered. Based on the best available information, the following actions are unlikely to result in a violation of section 9 of the Act, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

(1) Any actions that may affect the Coastal-Southern California DPS of the California spotted owl that are authorized, funded, or carried out by a Federal agency,

when the action is conducted in accordance with the consultation requirements for listed species pursuant to section 7 of the Act;

(2) Any action taken for scientific research carried out under a recovery permit issued by us pursuant to section 10(a)(1)(A) of the Act;

(3) Land actions or management carried out under a habitat conservation plan approved by us pursuant to section 10(a)(1)(B) of the Act; and

(4) Recreation activities that comply with local rules and that do not result in take of listed species, including hiking and backpacking.

Based on the best available information, the following activities may potentially result in a violation of section 9 of the Act if they are not authorized in accordance with applicable law; this list is not comprehensive:

(1) Unauthorized modification of the forest landscape within the range of the Coastal-Southern California DPS; and

(2) Unauthorized use of first- and second-generation anticoagulant rodenticides within the range of the Coastal-Southern California DPS.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act in regards to the Coastal-Southern California DPS of the California spotted owl should be directed to the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

## II. Proposed Rule Issued Under Section 4(d) of the Act

### Background

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. The U.S. Supreme Court has noted that statutory language similar to the language in section 4(d) of the Act

authorizing the Secretary to take action that she "deems necessary and advisable" affords a large degree of deference to the agency (see *Webster* v. *Doe*, 486 U.S. 592, 600 (1988)). 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. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting one or more of the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard 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 [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species, or [she] 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).

The provisions of this proposed 4(d) rule would promote conservation of the Sierra Nevada DPS of the California spotted owl by encouraging management of its habitat in ways that facilitate conservation for the species. The provisions of this proposed rule are one of many tools that we would use to promote the conservation of the Sierra Nevada DPS of the California spotted owl. This proposed 4(d) rule would apply only if and when we make final the listing of the Sierra Nevada DPS of the California spotted owl as a threatened species.

As mentioned above in **Available Conservation Measures**, section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, 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, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency 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 proposed critical habitat.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of Federal actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 et seq.) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from 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.

These requirements are the same for a threatened species with a species-specific 4(d) rule. For example, a Federal agency's determination that an action is "not likely to adversely affect" a threatened species will require the Service's written concurrence. Similarly, a Federal agency's determination that an action is "likely to adversely affect" a threatened species will require formal consultation and the formulation of a biological opinion.

**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 conservation needs of the Sierra Nevada DPS of the California spotted owl. As discussed previously in **Summary of Biological Status and Threats**, we have concluded that the Sierra Nevada DPS of the California spotted owl is likely to become in danger of extinction within the foreseeable future primarily due to wildfire, tree mortality, drought, climate change, rodenticides, and barred owls. 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 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 Sierra Nevada DPS of the California spotted owl.

The protective regulations we are proposing for the Sierra Nevada DPS of the California spotted owl incorporate prohibitions from the Act's section 9(a)(1) to address the threats to the DPS. Section 9(a)(1) prohibits the following activities for endangered

wildlife: 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. This protective regulation includes all of these prohibitions because the Sierra Nevada DPS of the California spotted owl is at risk of extinction in the foreseeable future and putting these prohibitions in place will help to prevent further declines, preserve the DPS's remaining populations, slow its rate of decline, 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 Sierra Nevada DPS of the California spotted owl 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 preserve the DPS's remaining populations, slow their rate of decline, and decrease synergistic, negative effects from other ongoing or future threats. Therefore, we propose to prohibit take of the Sierra Nevada DPS of the California spotted owl, 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 against take of endangered wildlife, as set forth in 50 CFR 17.21 and certain other specific activities that we propose for exception, as described below.

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 Sierra Nevada DPS of the California spotted owl, are not expected to rise to the level that would have a negative impact (that is, would have only de minimis impacts) on the conservation of the DPS. The proposed exceptions to these prohibitions include the following provisions (described below) that are expected to have negligible impacts to the Sierra Nevada DPS of the California spotted owl and its habitat:

(1) Forest or fuels management to reduce the risk or severity of wildfire (such as prescribed fire) where fuels management activities are essential to reduce the risk 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 California spotted owl and its habitat and results in conservation benefits to California spotted owls.

(2) Habitat management and restoration efforts that are specifically designed to provide for the conservation of the California spotted owl's habitat needs and include measures that minimize impacts to the California spotted owl and its habitat. These activities must be carried out in accordance with finalized State or Federal agency conservation plans or strategies for the California spotted owl.

(3) Management or cleanup activities that remove toxicants and other chemicals from trespass cannabis cultivation sites in California spotted owl habitat. Cleanup of these sites may involve activities that may cause localized, short-term disturbance to

California spotted owls, as well as require limited removal of some habitat structures valuable to California spotted owls (e.g., hazard trees that may be a suitable nest site).

We may, under certain circumstances, issue permits to carry out one or more otherwise-prohibited activities, including those described above. The regulations at 50 CFR 17.32 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.

We recognize the special and unique relationship 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 Sierra Nevada DPS of the California spotted owl that may result in otherwise prohibited take without additional authorization.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under

section 7 of the Act, or our ability to enter into partnerships for the management and protection of the Sierra Nevada DPS of the California spotted owl. However, interagency cooperation may be further streamlined through planned programmatic consultations for the DPS between us and other Federal agencies, where appropriate. We ask the public, particularly State agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that we could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see **Information Requested**, above).

## III. Critical Habitat

### Background

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 Federal agencies 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 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. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the Federal agency would be required to consult with the Service under section 7(a)(2) of the Act. However, even if the Service were to conclude that the proposed activity would likely 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 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 from 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 section 9 of the Act and 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 available information at the time of designation will not control the direction and substance of future recovery plans, HCPs, or other species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome.

**Prudency Determination**

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary

may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

As discussed earlier in this document, there is currently no imminent threat of collection or vandalism identified under Factor B for this species, and identification and mapping of critical habitat is not expected to initiate any such threat. In our SSA report and proposed listing determination for the California spotted owl, we determined that the present or threatened destruction, modification, or curtailment of habitat or range is a threat to both the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl, and that those threats in some way can be addressed by section 7(a)(2) consultation measures. The two DPSs occur wholly in the jurisdiction of the United States, and we are able to identify areas that meet the definition of critical habitat. Therefore, because none of the circumstances enumerated in our regulations at 50 CFR 424.12(a)(1) have been met and because the Secretary has not identified other circumstances for which this designation of critical habitat would be not prudent, we have

determined that the designation of critical habitat is prudent for both the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl.

**Critical Habitat Determinability**

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the California spotted owl is determinable. 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."

When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

We reviewed the available information pertaining to the biological needs of the species and habitat characteristics where this species is located and data that would be needed to perform other required analyses. A careful assessment of the economic impacts that may occur due to a critical habitat designation is not yet complete, and we are in the process of working with the States and other partners in acquiring the complex information needed to perform that assessment. Because the information sufficient to perform a required analysis of the impacts of the designation is lacking, we conclude that the designation of critical habitat for both the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl 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 Executive Orders 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), E.O. 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial 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 sent letters to all affected Tribes when we began developing our 12-month finding for the California spotted owl. We will continue to work with Tribal entities during the development of a final determination on this proposal to list the Sierra Nevada DPS and the Coastal-Southern California DPS of the California spotted owl, as well as the proposed 4(d) rule for the Sierra Nevada DPS.

**References Cited**

A complete list of references cited in this proposed rule 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 the staff members of the Fish and Wildlife Service's Species Assessment Team and the 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, amend paragraph (h) by adding entries for "Owl, California spotted [Coastal-Southern California DPS]" and "Owl, California spotted [Sierra Nevada DPS]" to the List of Endangered and Threatened Wildlife in alphabetical order under BIRDS to read as follows:

**§ 17.11 Endangered and threatened wildlife.**

* * * * *

(h) * * *

| Common name | Scientific name | Where listed | Status | Listing citations and applicable rules |
|---|---|---|---|---|
| * * * * * * * | | | | |
| BIRDS | | | | |
| * * * * * * * | | | | |
| Owl, California spotted [Coastal-Southern California DPS] | *Strix occidentalis occidentalis* | California (All California spotted owls in the vicinity of the Coast, Transverse, and Peninsular mountain ranges from Monterey County in the north to San Diego County in the south, and south of the Tehachapi Pass within Kern County) | E | [*Federal Register* citation when published as a final rule]. |

| | | | | |
|---|---|---|---|---|
| Owl, California spotted [Sierra Nevada DPS] | *Strix occidentalis occidentalis* | California and Nevada (All California spotted owls in the vicinity of the Sierra Nevada mountain range and the Sierra Nevada foothills from Shasta and Lassen Counties in the north, but north of the Tehachapi Pass, Kern County to the south, and east to Carson City, Douglas, and Washoe Counties in Nevada). | T | [*Federal Register* citation when published as a final rule]; 50 CFR 17.41(n).[4d] |
| * * * * * * * | | | | |

3. Amend § 17.41 by adding a paragraph (n) to read as follows:

**§ 17.41 Special rules—birds.**

* * * * *

(n) California spotted owl (*Strix occidentalis occidentalis*), Sierra Nevada DPS.

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Sierra Nevada distinct population segment (DPS) of the California spotted owl. Except as provided under paragraph (n)(2) of this section and §§ 17.4, 17.5, and 17.7, 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 DPS:

(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 DPS, 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, and (c)(6) and (7) for endangered migratory birds.

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

(iv) Possess and engage in other acts with unlawfully taken wildlife, in accordance with the provisions set forth at § 17.21(d)(2) for Federal and state law enforcement officers regarding endangered wildlife, and in (d)(3) and (4) for certain persons as described therein with respect to sick, injured and/or orphaned endangered migratory birds.

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

(A) Forest or fuels management to reduce the risk or severity of wildfire (such as prescribed fire) where fuels management activities are essential to reduce the risk 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 California spotted owl and its habitat and results in conservation benefits to California spotted owls.

(B) Habitat management and restoration efforts that are specifically designed to provide for the conservation of the California spotted owl's habitat needs and include measures that minimize impacts to the California spotted owl and its habitat. These activities must be carried out in accordance with finalized State or Federal agency conservation plans or strategies for the California spotted owl.

(C) Management or cleanup activities that remove toxicants and other chemicals from trespass cannabis cultivation sites in California spotted owl habitat. Cleanup of these sites may involve activities that may cause localized, short-term disturbance to California spotted owls, as well as require limited removal of some habitat structures valuable to California spotted owls (e.g., hazard trees that may be a suitable nest site).

**Wendi Weber,**

*Acting Director,*

*U.S. Fish and Wildlife Service.*

[FR Doc. 2023-03526 Filed: 2/22/2023 8:45 am; Publication Date: 2/23/2023]