DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2018–0105; FF09E21000 FXES11110900000 201]

RIN 1018–BD85

Endangered and Threatened Wildlife and Plants; Endangered Species Status for Southern Sierra Nevada Distinct Population Segment of Fisher

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine endangered species status under the Endangered Species Act (Act), as amended, for the Southern Sierra Nevada Distinct Population Segment (DPS) of fisher (*Pekania pennanti*). This DPS occurs in California. The effect of this regulation will be to add this DPS to the List of Endangered and Threatened Wildlife.

DATES: This rule becomes effective [insert date 30 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: This final rule is available on the internet at http://www.regulations.gov in Docket No. FWS–R8–ES–2018–0105 and at https://www.fws.gov/Yreka. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at http:// www.regulations.gov. Comments, materials, and documentation that we considered in this rulemaking will be available by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Yreka Fish and Wildlife Office, 1829 South Oregon Street, Yreka, CA 96097; telephone 530–842–5763.

FOR FURTHER INFORMATION CONTACT: Jenny Ericson, Field Supervisor, Yreka Fish and Wildlife Office, telephone: 530–842–5763. Persons who use a telecommunications device for the deaf may call the Federal Relay Service at 1–800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if we determine that a species may be an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the *Federal Register* and make a determination on our proposal within 1 year. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designation of critical habitat can only be completed by issuing a rule.

What this document does. This rule will add the Southern Sierra Nevada DPS of fisher (*Pekania pennanti*) (SSN DPS) as an endangered species to the List of Endangered and Threatened Wildlife in title 50 of the Code of Federal Regulations at 50 CFR 17.11(h).

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species based on 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 identified multiple threats under various factors that are acting on, and will continue to act on the SSN DPS, the full list of which can be found in our final Species Report 2016 (Service 2016, entire). Of particular significance regarding implications for the DPS's status were loss and fragmentation of habitat resulting from high-severity wildfire and wildfire suppression (i.e., loss of snags and other large habitat structures on which the species relies), climate change, and tree mortality from drought, disease, and insect infestations. Also of significance were threats related to potential direct impacts to individual fishers (e.g., increased mortality, decreased reproductive rates, increased stress/hormone levels, alterations in behavioral patterns), including wildfire, increased temperatures resulting from climate change, disease and predation, exposure to toxicants, collisions with vehicles, and potential effects associated with small population size. These factors are resulting in a cumulative effect to such a degree that the best available information indicates the Southern Sierra Nevada DPS of fisher meets the definition of an endangered species.

Peer review and public comment. 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 sought, we sought comments from independent specialists to ensure that our consideration of the status of the species is based on scientifically sound data, assumptions, and analyses. We invited these peer reviewers to comment on both the draft species report (Service 2014) as well as the 2014 Proposed Rule. We also considered all comments and information received during three public comment periods (and one extension) for the 2014 Proposed Rule (79 FR 60419, 79 FR 76950, 80 FR 19953, 84 FR 644) and two comment periods for the 2019 Revised Proposed Rule (84 FR 60278, 84 FR 69712). All comments received during the peer review process and the public comment periods have either been incorporated in the final Species Report (Service 2016, entire), throughout this rule, or addressed in the Summary of Comments and Recommendations section.

Previous Federal Actions

We first found the West Coast DPS of fisher (previously delineated as a contiguous area encompassing parts of the three States of Washington, Oregon, and California) to be warranted for listing in 2004 and each subsequent year in the annual Candidate Notice of Review. On October 7, 2014, we proposed to list the West Coast DPS of fisher as a threatened species under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*) (79 FR 60419; Docket No. FWS–R8–ES–2014–0041) (hereafter referred to as 2014 Proposed Rule). On April 18, 2016, we withdrew the proposed rule to list the West Coast DPS of fisher (81 FR 22710), concluding that the potential threats acting upon the DPS were not of sufficient imminence, intensity, or magnitude to indicate that they were singly or cumulatively resulting in significant impacts at either the population or rangewide scales such that the DPS met the definition of an endangered or threatened species.

On October 19, 2016, the Center for Biological Diversity, Environmental Protection Information Center, Klamath-Siskiyou Wildlands Center, and Sierra Forest Legacy filed a complaint for declaratory and injunctive relief, alleging that our determination on the West Coast DPS of fisher violated the Act. By Order Re: Summary Judgment issued on September 21, 2018, the District Court for the Northern District of California vacated the listing withdrawal and remanded the Service's final determination for reconsideration. The Court's amended order, dated November 20, 2018, directed the Service to prepare a new determination by September 21, 2019.

On January 31, 2019, we reopened the comment period on the October 7, 2014, proposed rule to list the West Coast DPS of fisher as a threatened species (84 FR 644).

On May 17, 2019, the District Court for the Northern District of California granted a request by the Service for a 35-day extension to comply with the November 20, 2018, order as a result of delays due to the Federal Government's lapse in appropriations that prohibited the Service from working on this determination. The Court's amended order directed the Service to submit for publication a final listing determination or notice of a revised proposed rule by October 26, 2019, and in the event of publishing a revised proposed rule, submit for publication a final listing determination by April 25, 2020.

On November 7, 2019, we published a revised proposed rule to list the West Coast DPS of fisher (84 FR 60278) (hereafter referred to as 2019 Revised Proposed Rule). In the 2019 Revised Proposed Rule, we evaluated new information available since 2014 and reconsidered the best available information already in our files (including all peer, partner, and public comments received during previous comment periods as well as the two recent comment periods on the

2019 Revised Proposed Rule). In the 2019 Revised Proposed Rule, we concluded that the West Coast DPS of fisher continued to meet the definition of a threatened species based on cumulative effects associated with multiple threats across the DPS's range.

Additional information on Federal actions concerning the West Coast DPS of fisher prior to October 7, 2014, is outlined in the 2014 Proposed Rule (October 7, 2014, 79 FR 60419).

Summary of Changes from the 2019 Revised Proposed Rule

In this final listing rule, we incorporate additional information regarding the fishers, their habitat, and threats potentially impacting the species or its habitat (e.g., new information received during the open comment periods), and we further revise our approach to implementing the DPS policy with regard to fishers. Specifically, in the 2019 revised proposed rule we presented our delineation of the DPS for West Coast populations of fishers, which was revised from the 2014 Proposed Rule. This revised delineation identified the West Coast DPS as comprising the two extant historically native subpopulations, Northern California/Southern Oregon (NCSO) and Southern Sierra Nevada (SSN), as well as the Northern Sierra Nevada (NSN, also known as the Stirling subpopulation) and Southern Oregon Cascades (SOC) subpopulations that resulted from reintroductions within a portion of the historical range of the DPS. These four subpopulation groups occur geographically in essentially two groupings: NCSO (including NSN and SOC subpopulations) and the wholly separate SSN subpopulation.

In the 2014 Proposed Rule, we explained that the DPS we proposed to list included all the fisher subpopulations in the three western States (WA, OR, CA) known to be extant at that time. Thus, the DPS included the fisher subpopulations in NCSO (including SOC and NSN), SSN, and Olympic National Park (ONP) in Washington. Both the ONP and SOC subpopulations were established with fishers translocated from areas outside the three western States, e.g., British Columbia, Alberta, and Minnesota; the NCSO and SSN subpopulations were existing subpopulations historically indigenous to this three-State area, and NSN was established with fishers translocated from the NCSO source subpopulation.

However, we also included a discussion of potential alternative DPS configurations in the 2014 Proposed Rule, and we requested public comment and peer review on the two alternative DPS configurations.

DPS Alternative 1 consisted of a single DPS encompassing the extant subpopulations with unique genetic characteristics in California and southern Oregon (i.e., NCSO, NSN, and SSN). Alternative 1 focused on conservation of known fishers indigenous to this California and southern Oregon region, and it excluded all reintroduced subpopulations established with non-California/Oregon fishers (i.e., SOC and ONP). In addition, Alternative 1 excluded areas to the north of NCSO where subpopulations of historically indigenous fishers were likely extirpated. It included both SSN and NCSO (which includes NSN), which each have unique genetic characteristics; this inclusion would allow for management of both these native subpopulations as a single DPS. In addition, this would allow for recovery efforts throughout the historical range in California and southern Oregon.

DPS Alternative 2 consisted of two narrowly drawn DPSs around each of the extant subpopulations with unique genetic characteristics in California and southern Oregon (i.e., NCSO with NSN, and SSN). This alternative also focused on conservation of known fishers indigenous to this California and southern Oregon region with unique genetic characteristics, and it excluded all reintroduced subpopulations (i.e., SOC and ONP) established with non-

California/Oregon fishers. This Alternative excluded the areas to the north of NCSO where fisher subpopulations were likely extirpated; it included both NCSO (which includes NSN) and SSN subpopulations, which each have unique genetic characteristics; and it allowed for management of the subpopulations as separate DPSs, recognizing the unique genetic characteristics within each. In addition, if the magnitude of threats was found to be different in the two DPSs, this would allow for different management for each DPS with regard to recovery.

We received multiple comments on our DPS approach and possible alternative DPS configurations in response to the 2014 Proposed Rule. These comments spanned a broad range of responses from support for the full three-State DPS to support for each of the possible Alternatives to support for other configurations. The basis for the commenters' positions was equally varied; these positions ranged from supporting differing genetics between subpopulations to supporting the need for different management considerations. After consideration of all of these comments, we moved forward with a modified Alternative 1 in the 2019 Revised Proposed Rule, with the exception that we included SOC in the DPS (as part of NCSO). In the 2019 Revised Proposed Rule, we did not specifically state that the DPS was based on focusing on conservation of the extant subpopulations with unique genetic characteristics, but we did explain that the DPS was centered on what we called the "historically native" subpopulations (i.e., those subpopulations of known fishers indigenous to the California and southern Oregon region with unique genetic characteristics) and included SOC because of the recent interbreeding with indigenous NCSO fishers.

Our 2019 Revised Proposed Rule further sought comment regarding its revised DPS determination (84 FR at 60279). We received numerous comments regarding DPS in response to the 2019 Revised Proposed Rule, both during the initial 30-day comment period and in the subsequent 15-day comment period. Similar to the comments received on the 2014 Proposed Rule, the comments received on the 2019 Revised Proposed Rule expressed support for a wide range of DPS approaches. Various commenters suggested reverting back to the three-State DPS (i.e., include Washington State again), making all subpopulations (NCSO, SSN, NSN, and SOC) individual DPSs, having two separate DPSs as in Alternative 2, and not including SOC in any DPS configuration.

While the comments presented a broad range of positions regarding DPS approaches, there was also a relatively consistent theme regarding management considerations. Many comments pointed to a concept we presented in the 2014 Proposed Rule that outlined alternative DPSs based on recognizing the unique genetic characteristics within each subpopulation and allowing for separate management of these two population segments (NCSO [including NSN and SOC] and SSN).

In light of the numerous comments received during multiple comment periods over the last five years recommending we re-examine our DPS configuration, we have again re-evaluated our DPS approach. We determined that the most appropriate path forward was to evaluate the two population segments ((1) NCSO [including NSN and SOC] and (2) SSN) as individual DPSs (similar to Alternative 2 in the 2014 Proposed Rule). For each population segment, if both the discreteness and significance criteria were met, we would then evaluate the status for that individual DPS. We determined our analysis would focus on the conservation of extant subpopulations historically indigenous to the California and southern Oregon region with unique genetic characteristics (as outlined in the 2014 proposed rule) while also allowing for separate management of the two DPSs if either or both were warranted for listing. The concept of the possible need for different management between the two DPSs was further strengthened, in part, by the recent limited introduction of non-California/Oregon fisher genes into the NCSO subpopulation via interbreeding between NCSO and SOC fishers. We have now determined that the singular West Coast DPS configuration should instead be two separate DPSs: the NCSO DPS and the SSN DPS.

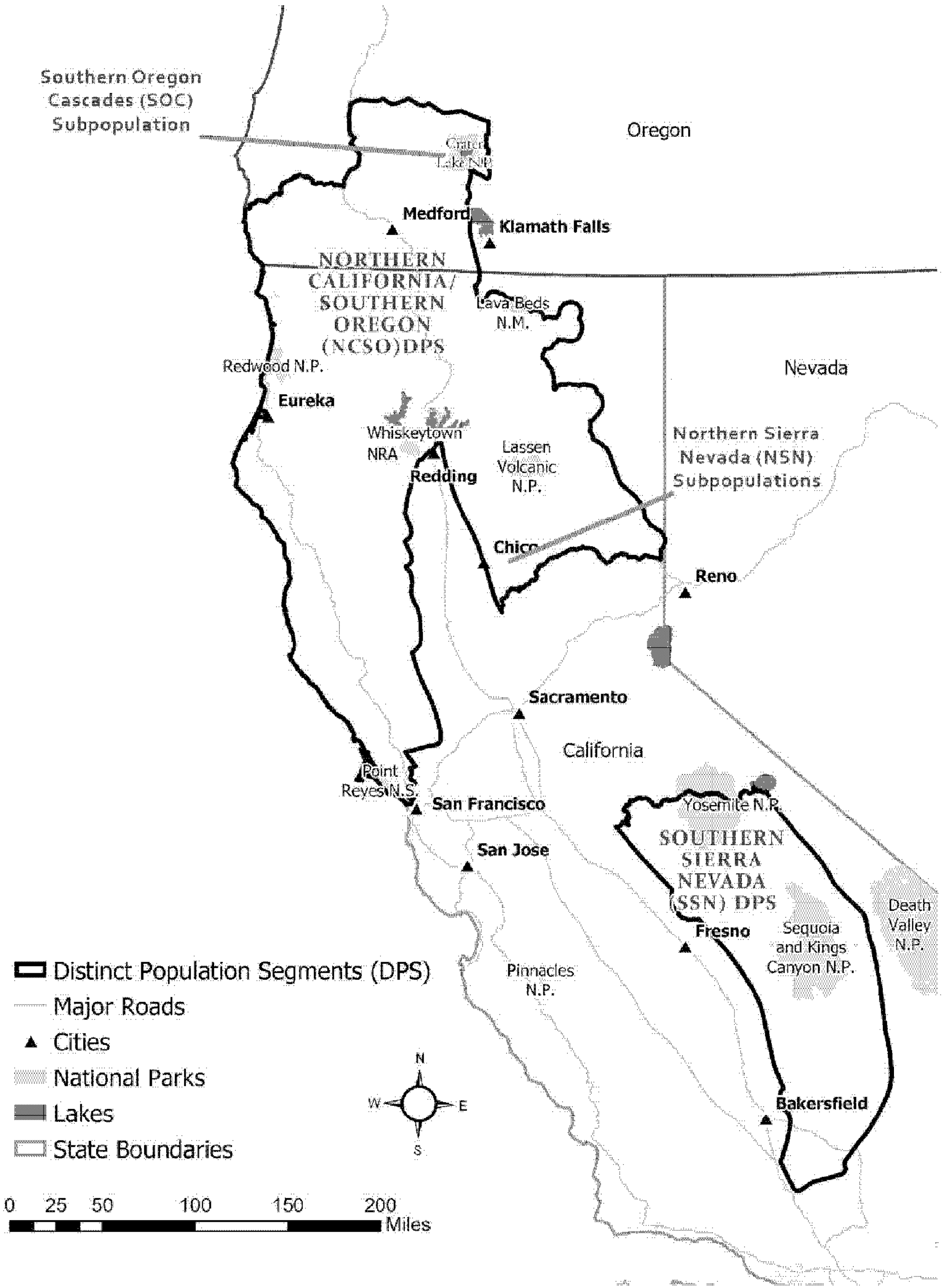

Figure 1. Distinct population segments (DPSs) and subpopulations of fisher in California and Oregon.

Our Revised Proposed Rule discussed how potential changes from the proposed rule to the final rule regarding status would constitute a logical outgrowth, stating "[b]ecause we will consider all comments and information received during the comment period, our final determination may differ from this proposed rule. Based on the new information we receive (and any comments on that new information), we may conclude that the species is endangered instead of threatened, or we may conclude that the species does not warrant listing as either an endangered or a threatened species. Such final decisions would be a logical outgrowth of this proposal as long as we: (1) Base the decisions on the best scientific and commercial data available after considering all of the relevant factors; (2) do not rely on factors Congress has not intended us to consider; and (3) articulate a rational connection between the facts found and the conclusions made, including why we changed our conclusion" (84 FR at 60279). This approach herein is a logical outgrowth from our previous proposed rules for the following reasons:

First, our 2014 Proposed Rule (October 7, 2014, 79 FR 60419) recognized that for fisher, the Service's DPS analysis had started with the petitioned DPS, which included portions of California, Oregon, and Washington, but also pointed out that the Service had "identified smaller areas within the larger DPS boundary that would also potentially constitute a valid DPS, and that may warrant listing under the Act" (84 FR at 60438). The 2014 Proposed Rule further announced the Service's evaluation of a "number of alternative DPSs that may potentially also be valid DPSs (covering a smaller entity or entities)" and that the Service was considering in particular the appropriateness of two of these alternatives, and seeking public and peer review input on potential DPS alternatives (84 FR at 60438). One of these alternatives was Alternative 2, which consisted of two narrowly drawn DPSs around the extant subpopulations with unique genetic characteristics in California and southern Oregon; Alternative 2 is extremely similar to the two DPS approach we use here. Therefore, the public has seen this approach presented before, was aware that we were considering it and this could anticipate that adoption of this approach was possible, and had several opportunities to provide comments on the approach.

Second, we outlined the uncertainty associated with our DPS approach in the 2014 Proposed Rule and alerted the public to this uncertainty. Specifically, p. 60441 of our 2014 Proposed Rule stated "[w]e seek peer review and public comment on the uncertainties associated with the specific topics outlined above in the Information Requested section and in this Other DPS Alternatives section. We envision that specific information from the peer reviewers and the public on the proposed DPS and the two alternatives will inform our final listing decision."

Third, our 2014 Proposed Rule explained to the public that the DPS approach in our final rule may differ from the proposed rule as a result of public comment. On p. 60438, we stated "[t]hrough peer review and public comment we may determine that the proposed DPS as set forth in this document is the most appropriate for fisher conservation. Alternatively, we could determine that one of the alternative DPSs set forth below would be most appropriate for the conservation of fisher. Therefore, any final listing determination may differ from this proposal." In the 2019 revised proposed rule, we further alerted the public to the possibility that a different final decision would be a logical outgrowth of the proposal if we "(1) base the decisions on the best scientific and commercial data available after considering all of the relevant factors; (2) do not rely on factors Congress has not intended us to consider; and (3) articulate a rational connection between the facts found and the conclusions made, including why we changed our conclusion" (84 FR at 60279). As outlined above, we have explained the basis for this changed

DPS and have articulated a rational connection between the facts found and our conclusion by which we have determined to separate the singular West Coast DPS configuration into two separate DPSs.

The Secretary has discretion when determining DPSs based upon the Congressional guidance that the "authority to list DPS's be used '…sparingly' while encouraging the conservation of genetic diversity and in consideration of available scientific evidence of the discrete Population segment's importance to the taxon to which it belongs" (61 FR 4722, 4725 (February 7, 1996)). Our DPS approach of evaluating the two fisher population segments ((1) NCSO [including NSN and SOC] and (2) SSN) as separate DPSs encourages the conservation of genetic diversity by focusing on conserving extant native subpopulations with unique genetic characteristics.

In the 2019 Revised Proposed Rule (84 FR 60278), we proposed to list the West Coast DPS as a threatened species under the Act, and we also proposed a concurrent rule under section 4(d) of the Act for that DPS. This final determination represents a change to that proposal. We now add the SSN DPS as an endangered species to the List of Endangered and Threatened Wildlife, and we present our finding that the NCSO DPS does not warrant listing under the Act. In addition, new information has been considered in this final rule that was not available for the 2014 Proposed Rule, the 2014 draft Species Report (Service 2014, entire), the 2016 final Species Report (Service 2016, entire), or the 2019 Revised Proposed Rule. We reviewed an extensive amount of new information available since 2016, some of which was included in the 2019 Revised Proposed Rule, and all of which is available in the decision record for this rule. This final determination is based on the best scientific and commercial data available and clearly articulates the rationale for the change in our conclusion.

Distinct Population Segment Analysis

Under section 3(16) of the Act, we may consider for listing any species, including subspecies, of fish, wildlife, or plants, or any DPS of vertebrate fish or wildlife that interbreeds when mature (16 U.S.C. 1532(16)). Such entities are considered eligible for listing under the Act (and, therefore, are referred to as listable entities), should we determine that they meet the definition of an endangered or threatened species.

Under the Service's DPS Policy (61 FR 4722, February 7, 1996), three elements are considered in the decision concerning the determination and classification of a possible DPS as threatened or endangered. These elements include:

(1) The discreteness of a population in relation to the remainder of the species to which it belongs;

(2) The significance of the population segment to the species to which it belongs; and

(3) The population segment's conservation status in relation to the Act's standards for listing, delisting, or reclassification (i.e., is the population segment endangered or threatened).

A population segment of a vertebrate taxon may be considered discrete under the DPS policy if it satisfies either one 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.

(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.

If a population segment is considered discrete under one or more of the conditions described in the Service's DPS policy, its biological and ecological significance will be considered in light of Congressional guidance that the authority to list DPSs be used "sparingly" (see Senate Report 151, 96th Congress, 1st Session). In making this determination, we consider available scientific evidence of the DPS's importance to the taxon to which it belongs. Since precise circumstances are likely to vary considerably from case to case, the DPS policy does not describe all the classes of information that might be used in determining the biological and ecological importance of a discrete population. However, the DPS policy describes four possible classes of information that provide evidence of a population segment's biological and ecological importance to the taxon to which it belongs. As specified in the DPS policy, this consideration of the population segment's significance may include, but is not limited to, the following:

(1) Persistence of the DPS in an ecological setting unusual or unique to the taxon;

(2) Evidence that loss of the DPS would result in a significant gap in the range of a taxon;

(3) Evidence that the DPS 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 DPS differs markedly from other populations of the species in its genetic characteristics.

To be considered significant, a population segment needs to satisfy only one of these criteria, or other classes of information that might bear on the biological and ecological importance of a discrete population segment, as described in the DPS policy. Below, we summarize discreteness and significance for each of the DPSs.

Northern California/Southern Oregon DPS of Fisher (NCSO DPS)

Discreteness

The NCSO DPS is markedly separate from other North American fisher populations to the east by enormous distances, geographical barriers, unsuitable habitat, and urban development. Fishers in this DPS are separated from the Rocky Mountains and the rest of the fisher taxon in the central and eastern United States by natural physical barriers including the non-forested high desert areas of the Great Basin in Nevada and eastern Oregon. Other physical barriers that separate the NCSO DPS from Rocky Mountain and eastern United States fisher populations include large areas without forests, including urban and rural open-canopied areas, agricultural development, and other non-forested areas.

The NCSO DPS is also markedly separate from fisher populations to the north by approximately 560 miles (mi) (900 kilometers (km)) (to the current populations of fishers in Canada) and 270 mi (430 km) (to the reintroduced fisher populations in Washington). These distances are well beyond the various reported fisher dispersal distances (as described in more detail in Service 2016, pp. 13–14). An additional component contributing to marked separation between the NCSO DPS and fishers in Washington is the Columbia River and adjacent human developments (e.g., roads and towns); these likely act as a physical impediment to crossing by fishers dispersing in either direction. While juvenile fishers dispersing from natal areas are capable of moving long distances and navigating various landscape features such as highways, rivers, and rural communities to establish their own home range (Service 2016, pp. 13–14), the magnitude of these impediments and the distance between the NCSO DPS and Washington State fishers would preclude this possibility. Therefore, it is extremely unlikely that any transient individuals from the NCSO DPS could disperse far enough to reach the Washington range of reintroduced fishers, and even if they attempted to do so, they would likely not be able to cross the Columbia River. Not only is the river especially wide and deep year-round, but in the Cascade Range, it is bordered on one side by an interstate highway, a 2-lane state highway on the other side, as well as a railroad track on both sides. These impediments further restrict the ability of fishers to surpass this obstacle.

In addition, the NCSO DPS is also markedly separate from the SSN DPS to the southeast by approximately 130 mi (209 km) from the southern end of the NCSO DPS to the northern end of the SSN DPS. This distance, although less than that between the NCSO DPS and Washington fishers, is still several times beyond the known maximum dispersal distances for fishers (Zielinski et al. 2005, p. 1402). The intervening habitat between the NCSO DPS and SSN DPS is additionally characterized by habitat that is highly altered with reduced forest density and increased human development of the landscape further limiting potential fisher dispersal across this region (Zielinski et al. 2005, p. 1403).

In summary, the NCSO DPS is geographically isolated from all other populations of the species. Therefore, the marked separation condition for discreteness is met by geographical barriers, urban development, unsuitable habitat, and distances that are beyond the known dispersal distance of fishers.

Significance

For the NCSO DPS, we found that a combination of several of the criteria listed above provide evidence of its biological and ecological importance to the taxon. First, we note that the NCSO DPS represents a large portion of the taxon's range along the Pacific coast, and its loss would leave a significant gap between the SSN DPS and all fisher populations to the north. While we recognize that the NCSO DPS is geographically separated from other fisher populations, and this separation likely precludes the NCSO DPS from ever acting as a connection for a contiguous range of fishers from the SSN DPS to Canada, we note that its loss would still result in an even greater break in the west coast range of fishers than what currently exists. Furthermore, the NCSO DPS supports thousands of individuals while the SSN just a few hundred and populations in Washington are still small. Therefore, a loss of the NCSO DPS would mean the majority of the fishers in the West Coast states would be lost.

Significance is also demonstrated by the NCSO DPS's marked difference from other populations of the species in their genetic characteristics. The NCSO DPS is primarily comprised of fishers native to this region of the country and which are genetically distinct from fishers in the remainder of North America (for example, Canada, Rocky Mountains, and Great Lakes). In addition, fishers in the NCSO DPS are also genetically distinct from those found in the SSN DPS, as we describe in Service 2016 (pp. 134-135). We note the NCSO DPS does include the translocated SOC subpopulation, which was established with fishers not native to this region (i.e., British Columbia and Minnesota) and which do not share all the same genetic characteristics of the native fishers. However, it is highly unlikely that the unique genetic characteristics that have evolved over time as native fishers in the NCSO DPS have adapted to the environmental conditions of this area will be lost as a result of this very limited introduction of genes from fishers not indigenous to this region. Although there is interbreeding between SOC and indigenous fishers, we base our conclusion on the fact that SOC fishers do not appear to have expanded their range far from their original reintroduction area since their translocation over 40 years ago (Barry 2018, p. 23).We therefore conclude that the loss of fishers in the NCSO DPS would result in a reduction of the species' overall genetic diversity.

In light of the above, we conclude that the NCSO DPS is significant to the fisher taxon.

Summary

Given that both the discreteness and the significance elements of the DPS policy are met for fisher in the Northern California/Southern Oregon portion of its range, we find that the NCSO DPS of fisher is a valid DPS. Therefore, the NCSO DPS of fisher is a listable entity under the Act.

Southern Sierra Nevada DPS of Fisher (SSN DPS)

Discreteness

Similar to the NCSO DPS, the SSN DPS is markedly separate from other North American fisher populations to the east by enormous distances, geographical barriers, unsuitable habitat, and urban development. Fishers in this DPS are separated from the Rocky Mountains and the rest of the taxon in the central and eastern United States by natural physical barriers including the non-forested high desert areas of the Great Basin in Nevada and eastern Oregon. Other physical barriers that separate the SSN DPS from Rocky Mountain and eastern United

States fisher populations include large areas of unsuitable habitat such as urban and rural open-canopied areas, agricultural development, and other non-forested areas.

As noted above, the SSN DPS is markedly separate from the NCSO DPS by approximately 130 mi (209 km). The intervening habitat between the NCSO DPS and SSN DPS is additionally characterized by habitat that is highly altered with reduced forest density and increased human development of the landscape further limiting potential fisher dispersal across this region (Zielinski et al. 2005, p. 1403). In addition, the SSN DPS is also considerably farther away from the Washington State and Canada fisher populations than the NCSO DPS, clearly meeting the marked separation condition of discreteness.

In summary, the SSN DPS is geographically isolated from all other populations of the species. Therefore, the marked separation condition for discreteness is met by geographical barriers, urban development, unsuitable habitat, and distances that are beyond the known dispersal distance of fishers.

Significance

For the SSN DPS, we also found that a combination of the criteria listed above provide evidence of its biological and ecological importance to the taxon. First, we note that the SSN DPS represents the southernmost periphery of the taxon's range. Loss of the SSN DPS would shift representation of the taxon at its southern boundary approximately 400 miles northward to the range of the NCSO DPS.

We also note that the SSN DPS differs markedly from other populations of the species in its genetic characteristics. The SSN DPS is wholly comprised of fishers native to this region of the country, and these fishers are genetically distinct from fishers in the remainder of North

America (for example, Canada, Rocky Mountains, and Great Lakes). In addition, fishers in the SSN DPS are also genetically distinct from those found in the NCSO DPS. Further, there is high genetic divergence between the SSN DPS and NCSO DPS with the populations being separated for thousands of years (Tucker et al. 2014, p. 3). The SSN DPS has only a single mitochondrial DNA haplotype, which is genealogically unique from the rest of the fisher taxon, including the NCSO DPS (Knaus et al. 2011, p. 7, 11; Tucker 2019 personal communication). In addition, the SSN DPS has a unique distribution of alleles in comparison to the NCSO DPS (Tucker et al. 2012, p. 6). We therefore conclude that the loss of fishers in the SSN DPS would result in a reduction of the species' overall genetic diversity.

In light of the above, we conclude that the SSN DPS is significant to the fisher taxon.

Summary

Given that both the discreteness and the significance elements of the DPS policy are met for fisher in the Southern Sierra Nevada portion of its range, we find that the SSN DPS of fisher is a valid DPS. Therefore, the SSN DPS of fisher is a listable entity under the Act.

Background

General Species Information

Species Information and Distribution

The fisher is a medium-sized, light brown to dark blackish-brown mammal found only in North America, with the face, neck, and shoulders sometimes being slightly gray, and the chest and underside often having irregular white patches. The fisher is classified in the order Carnivora, family Mustelidae, which is a family that also includes weasels, mink, martens, and otters (Service 2016, p. 8). The occurrence of fishers at regional scales is consistently associated with low- to mid-elevation coniferous and mixed conifer and hardwood forests with characteristics of mid- and late-successional forests (e.g., diverse successional stages, moderate to dense forest canopies, large-diameter trees, coarse downed wood, and singular features of large snags, tree cavities, or deformed trees). Throughout their range, fishers are obligate users of tree or snag cavities for denning, and they select denning and resting sites with a high proportion of characteristics associated with late-successional forests, such as snags, down wood, and vertical and horizontal diversity. These characteristics are maintained and recruited in the forest through ecological processes such as fire, insect-related tree mortality, disease, and decay (e.g., Service 2016, pp. 64, 123–124).

Fishers on the west coast of the continent have historically occurred in British Columbia, Washington, Oregon, and California. Fishers indigenous to the west coast in the contiguous United States were historically well distributed in the habitats described above, from the State of Washington south through Oregon, and into northern California and the Sierra Nevada mountains. Subpopulations of these indigenous fishers still occur in northern California/southwestern Oregon and the Sierra Nevada; however, populations of indigenous fishers were extirpated from Washington (Lewis and Hayes 2004, p. 1) and northern Oregon (Aubry and Lewis 2003, pp. 81–82). Recent surveys in the northern Oregon Cascades yielded no fishers (Moriarty et al. 2016, entire), suggesting they remain absent in this area, whereas surveys in the southern Oregon Cascades suggest fishers in this locale may be shifting to the south (Barry 2018, pp. 22–23) compared to their distribution in the late 1990s (Service 2014 and 2016, entire, though see current condition section for NCSO). Fishers in the southern Oregon Cascades were translocated from British Columbia and Minnesota circa 1980. In addition, a translocation of fishers from northwestern California to the northern Sierra Nevada (also called the Stirling subpopulation) occurred in 2009.

Fishers now occurring and reproducing in Washington were established using fishers translocated from outside this three-State region. Fishers from British Columbia were reintroduced to the Olympic Peninsula from 2008 to 2010 (Happe et al. 2017, p. viii; Happe et al. 2020, p. 345) and to the Washington Cascade Range south of Mt. Rainier from 2015 to 2017 (Lewis *et al.* 2018, p. 5). Reproduction has been documented in both areas. Beginning in 2018, fishers from Alberta were released in the northern Washington Cascades in North Cascades National Park; all animal translocations are expected to be completed in 2020 (Hayes and Lewis 2006, p. 35; Lewis *et al.* 2019, pp. 19-20).

Fishers were once well distributed throughout their historical range in the habitats described above. In Oregon and California, outside of the existing NCSO DPS and SSN DPS (see Figure 1, above), fishers are considered likely extirpated, though occasional sightings, verifiable and unverifiable, are reported. Additionally, in California, recent survey efforts have not detected fishers south of the reintroduced NSN subpopulation or north of the SSN DPS.

Additional information on the species' biology and distribution is described in the final Species Report (Service 2016, pp. 9–12, 25–53).

General Threat Information

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 is an "endangered species" or a "threatened species." The Act defines an endangered species as a species that is "in danger of extinction throughout all or a significant portion of its range," and a threatened species as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether any species is an "endangered species" or a "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence. These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

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

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, 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, and 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. In our determination, we correlate the threats acting on the species to the factors in section 4(a)(1) of the Act.

Potential threats currently acting upon the both the NCSO DPS and SSN DPS, or likely to affect them in the future, are evaluated and addressed in the final Species Report (Service 2016, pp. 53–162). In determining the foreseeable future, the immediacy of each threat was assessed independently based upon the nature of the threat and time period that we can be reasonably certain the threat is acting on fisher populations or their habitat. In general, we considered that the trajectories of the threats acting on fisher subpopulations across the DPS's range could be reasonably anticipated over the next 35–40 years. The reader is directed to the Species Report (Service 2016, entire) for a more detailed discussion of the threats summarized in this document (http://www.fws.gov/cno/fisher/). However, please note that our most recent consideration of new data since 2016 (including comments and information received during the two comments periods associated with the 2019 Revised Proposed Rule) coupled with our reevaluation of the entirety of the best available scientific and commercial information is represented and summarized in the various analyses below.

Our analyses below represent an evaluation of the biological status of the two DPSs, based upon our assessment of the cumulative impact of all effects anticipated from the identified threats, and how that cumulative impact may affect each DPS's continued existence currently and in the future. We used the best available scientific and commercial data, and the expert opinions of the analysis team members. The threats identified as having the potential to act upon both DPSs include: habitat-based threats, including high-severity wildfire, wildfire suppression activities, and post-fire management actions; climate change; tree mortality from drought, disease, and insect infestation; vegetation management; and human development (Factor A). We also evaluated potential threats related to direct mortality of fishers including trapping and incidental capture (Factor B), research activities (Factor B), disease or predation (Factor C), collision with vehicles (Factor E), exposure to toxicants (Factor E), and potential effects associated with small population size (Factor E). Finally, we also evaluated the inadequacy of existing regulatory mechanisms (Factor D).

As we conducted our threats analyses, we began under the premise that those with the greatest potential to become significant drivers of the future status of both DPSs were: wildfire and wildfire suppression; tree mortality from drought, disease, and insect infestation; the potential for climate change to exacerbate wildfire and tree mortality; threats related to vegetation management; and exposure to toxicants. Upon determining that the previous singular West Coast DPS configuration should instead be two separate DPSs, we then also modified our premise regarding threats with the potential to become significant drivers of status, and included: the potential for effects from small population size; disease or predation; and collision with vehicles. While our assessment of the status of each DPS was based on analysis of the cumulative effects of all identified threats acting upon them, we are only presenting our detailed analyses on these specific, potentially significant threat drivers common to both DPSs for the purposes of this rulemaking. We refer the reader to the Species Report (Service 2016, entire) for full detailed analyses of all the other individual threats.

As these potentially significant threat drivers were relevant to both DPSs, much of the fundamental information pertaining to the threats were also applicable to both DPS analyses. Although the ultimate conclusion about the significance of each threat varied between the DPSs, below we present scientific information about these threats common to both DPSs, followed by DPS-specific evaluations.

Wildfire and Wildfire Suppression

Our evaluation includes both the effects of wildfire on fisher habitat as well as those activities associated with wildfire suppression that may result in changes to fisher habitat (for example, backburning, fuel breaks, and snag removal). Naturally occurring fire regimes vary widely within the range of both the NCSO DPS and SSN DPS (Service 2014, p. 58), and fisher habitat has been burned across a spectrum from low- to high-severity.

Mixed-severity wildfire includes patches of low-severity wildfire and patches of high-severity wildfire (Jain et al. 2012, p. 47). At the landscape scale, mixed-severity wildfire effects to fisher habitat may only affect an area's ability to support fishers for a short period of time due to the patchy nature of burned and unburned areas. Additionally, a beneficial aspect of mixed-severity wildfires (as opposed to just high-severity wildfires) is that these wildfires may contribute to the regeneration of the hardwood component of mixed-conifer forest used by fisher (Cocking et al. 2012, 2014, entire). Further these types of fires can sustain patches of unburned refugia that are important for maintaining patches of higher canopy cover, acting as a source for future tree regeneration, and providing habitat for fisher (Blomdahl et al. 2019, p. 1049). Mixed-severity wildfire may reduce some elements of fisher habitat temporarily, but also helps to contribute to the ecological processes necessary to create tree cavities and other decay and structural abnormalities essential for denning and resting fishers (Weir et al. 2012, pp. 237–238). Low-severity wildfire is unlikely to remove habitat, and post-wildfire areas are likely still used by fishers (Naney et al. 2012, p. 6; Truex and Zielinski 2013, p. 90).

The potential for large high-severity wildfires to affect fisher habitat and fisher populations is concentrated in northern California–southwestern Oregon and the Sierra Nevada areas as compared to the remainder of the fisher's historical range in the West Coast States (Service 2014, p. 62–63). In general, high-severity wildfire can alter fisher habitat by removing forest canopy, large trees, and structurally diverse understories, which can take from decades to a century or more to regrow (Service 2014, p. 59–60), but it may also provide foraging opportunities for fishers since these post-fire areas are often abundant in the small mammals that fishers eat (Hanson 2013, p. 27; Service 2016, p. 66). For example, there is evidence of fishers associated with high-severity burned areas, or a mix of moderate- and high-severity burns (Service 2016, p. 66), particularly if the area was structurally complex prior to the fire (Hanson 2013, p. 28). However, another study found fishers avoiding areas of high and moderate severity fire (Thompson et al. 2019a, p. 15), so there is likely a threshold in high severity patch size that influences fisher use of these areas (also see individual DPS sections).

Within shrub, grassland, and forested lands across the western United States (including the Sierra Nevada, southern Cascades, and Coast ranges), the wildfire season length increased over each of the last 4 decades, from 65 days in the 1970s to 140 days in the 2000s (Westerling 2016, p. 3, 8, 10). The lengthening of the wildfire season is largely due to declining mountain snowpack and earlier spring snowmelt, which contributes to a decrease in vegetation moisture; this causes wildfires to be more frequent and larger with an overall increase in the total area burned (Westerling 2016, p. 8–9). Throughout the western United States there has been an increase in the patch size and total area of fires in recent decades. The evidence for an increasing area of high-severity fire is mixed given that studies present different historical levels of high-severity fire (Mallek *et al.* 2013, p. 11–17; Stephens et al. 2015, p. 12–16; Hanson and Odion 2016, p. 12–17; Odion et al. 2016, entire; see Spies et al. 2018, p. 140 for summary of recent literature), but the scientific consensus accepts that mixed conifer forests were characterized by areas burned at low-, moderate-, and high-severity, with higher proportions of low-severity than is currently observed (Safford and Stevens 2017, p. 50). Given projected changes in climate, forests are expected to become more vulnerable to wildfires over the coming century.

Recent publications on wildfire occurrence and severity within the NCSO DPS and SSN DPS continue to support our conclusions that fire is likely to have a negative impact on fisher populations but will depend on fire size, burn severity, and proximity to occupied habitat (79 FR 60419, at 60429). Recent information on fishers' behavioral and localized population response to wildfires is available for both the NCSO DPS and SSN DPS and is discussed further below.

<u>Climate Change</u>

Overall, fisher habitat is likely to be affected by changing climate conditions, but the severity will vary, potentially greatly, among different regions, with effects to fishers ranging from negative, neutral, or potentially beneficial. Climate throughout the West Coast States is projected to become warmer over the next century, and in particular, summers will be hotter and drier, with heat waves that are more frequent (Hayhoe et al. 2004, p. 12,423; Tebaldi et al. 2006, pp. 191–200; Mote and Salathé 2010, p. 41; Salathé et al. 2010, p. 69; Cayan et al. 2012, p. 4, 10; Mote et al. 2013, p. 34; Pierce et al. 2013, p. 844, 848; Ackerly et al. 2018, pp. 6-8; Bedsworth et al. 2018, pp. 23, 26, 30; Dettinger et al. 2018, p. 5; Grantham 2018, p. 6).

In Oregon, Dalton et al. (2017, pp. 4, 8) evaluated greenhouse gas emissions via global climate models with future emission pathways called "representative concentration pathways" (RCPs). They considered multiple greenhouse gas emission scenarios, including low (RCP 4.5) and what they termed "business-as-usual" (RCP 8.5). Their analysis indicates that extreme heat events are expected to increase in frequency, duration, and intensity by the 2050s due to warming temperatures (RCP 4.5 = mean annual temperature increase predicted on average 3.6 degrees Fahrenheit (°F) (2.0 degrees Celsius (°C)); RCP 8.5 = mean annual temperature increase predicted on average 5.0 °F (2.8 °C). Summers are expected to warm more than the annual average and will likely become drier. Annual precipitation is projected to increase slightly, although with a high degree of uncertainty. Extreme heat and precipitation events are expected to increase in frequency, duration, and intensity.

In California, information from Pierce *et al.* (2013) and Safford *et al.* (2012) used multiple general circulation models and downscaling with regional climate models to develop probabilistic projections of temperature and precipitation changes over California by the 2060s. Predictions indicate an annual mean temperature increase of 4.3 °F (2.4 °C) by 2060 (Pierce *et al.* 2013, p. 844). Similarly, and more recently, Bedsworth *et al.* (2018, entire) summarizes forty-four technical peer reviewed reports to provide a California-wide climate change assessment. Under two modeled scenarios, average temperatures are projected to increase by 2.5 to 2.7 °F (1.4 to 1.5 °C) in the early century (2006 to 2039), 4.4 to 5.8 °F (2.4 to 3.2 °C) in the mid-century (2040 to 2069), and 5.6 to 8.8 °F (3.1 to 4.9 °C) in the late-century (2070 to 2100) (Bedsworth *et al.* 2018, p. 23). Precipitation models suggest that northern California may become wetter, while most southern parts of California will become drier (Bedsworth *et al.* 2018, p. 25). The authors caution that "due to large annual variation, changes in annual mean or long-term precipitation are not the best metrics to understand" the effects to changes in precipitation in California (Bedsworth *et al.* 2018, p. 25). Specifically, the models project less overall precipitation with more extreme daily precipitation, inter-annual precipitation will be more erratic, and the number of dry years will increase (Bedsworth *et al.* 2018, p. 25 citing others; Polade *et al.* 2017, p. 1).

Higher temperatures during spring and summer, coupled with early snow melt, will reduce the moisture of both live fuels and dead surface fuels by increasing evaporative demands during the dry season and lengthening the fire season (Keeley and Syphard 2016, pp. 2–3; Restaino and Safford 2018, p. 500). In addition, models project an increase in lightning frequency that may be associated with an increase in potential fire ignitions (Restaino and Safford 2018, p. 500).

Studies specific to predicting the effects of climate change on suitable fisher habitat have produced a wide range of results. Ecotype conversion from conifer forest to woodland, shrubland, or grassland will result in the loss of suitable fisher habitat. This type of shift is predicted, for example, in the southern Sierra Nevada (Gonzalez *et al.* 2010, fig. 3; Lawler *et al.* 2012, p. 388; Dettinger *et al.* 2018, pp. 31-34; Restaino and Safford 2018, p. 500). On the other hand, shifts from conifer forest to hardwood-dominated mixed forest in the southern Sierra Nevada or Klamath region could either increase or decrease the habitat available to fishers (Lawler *et al.* 2012, pp. 384–386; Loarie *et al.* 2008, p. 4 and fig. 4). Given the more significant contribution of hardwood trees to fisher habitat in the drier parts of both the NCSO DPS and SSN DPS, a shift to increasing hardwoods in more coastal or higher elevation forest types could improve habitat, but shifts to hardwood dominated stands may also reduce protective cover from rain and snowfall (Suffice *et al.* 2019, pp. 10, 11, 13). Nevertheless, trees are long-lived and mature forests can persist under suboptimal conditions, and this can prevent better-suited vegetation from becoming established until disturbance removes the original forest (Sheehan *et al.* 2015, p. 27). Consequently, the increase in the hardwood component of fisher habitat in predominantly conifer areas may not occur until after fires have changed the composition of the existing stand to allow hardwood establishment. All of this adds to the uncertainty associated with climate change and how it relates to fisher.

Other studies suggest that climate change will adversely impact forest habitat by intensifying large-scale, high-severity wildfire, drought, and tree mortality (Kadir *et al.* 2013, pp. 132, 137; Westerling 2016, pp. 1–2; Westerling 2018, pp. 21-23; Bedsworth *et al.* 2018, p. 64; Dettinger *et al.* 2018, pp. 28–29; Stephens *et al.* 2018a, p. 77; Stephens *et al.* 2018b, p. 162; Restaino and Safford 2018, pp. 493-505). A wide range of assumptions and caveats typically accompanies these types of predictions. For example, fire modeling shows a decline in future (approximately 100 years) fire intensities after the existing woody vegetation is burned (Restaino and Safford 2018, p. 499), but it is uncertain if the resulting vegetation and composition will be suitable for fisher.

Variables predicting fisher resting habitat as described by Zielinski and Gray 2018 (p. 903) include stand characteristics such as high canopy closure, large basal area of conifer and hardwood trees, and diameter and age of dominant conifers. To date, climate change has not significantly affected resting habitat for fishers, which, according to Zielinski and Gray (2018, pp. 899, 903), has remained stable over the past 20 years across the California-portion of the range, although habitat suitability tends to be lower on private lands than public lands. However, when considering resting habitat trends over these 20 years to determine potential future resting habitat conditions in light of climate change projections, data from the Sierra National Forest (within a portion of the SSN DPS) indicates the beginning of a negative trend in resting habitat suitability (Zielinski and Gray 2018, p. 903), whereas resting habitat examined within the NCSO DPS varied greatly (i.e., suitable resting habitat decreased in the Shasta-Trinity National Forest, increased in the Six Rivers National Forest, and remained unchanged over time for both the Klamath and Mendocino National Forests).

In addition to the potential climate change effects to fisher habitat discussed above, some researchers have suggested climate change may cause direct effects to fishers, including increased mortality, decreased reproductive rates, alterations in behavioral patterns, and range shifts. Fishers may be especially sensitive, physiologically, to warming summer temperatures (Zielinski *et al.* 2004, p. 488; Slauson *et al.* 2009, p. 27; Facka 2013, pers. comm.; Powell 2013, pers. comm.). As a result, researchers (e.g., Burns *et al.* 2003, Zielinski *et al.* 2004, Lawler *et al.* 2012, Olson *et al.* 2014) theorize that fishers likely will either alter their use of microhabitats or shift their range northward and upslope, in order to avoid the thermal stress associated with increased summer temperatures. Preliminary research on fisher occupancy and climate begins to support these theories. For example, during a drought in central and southern California from 2012 to 2015, fisher utilized higher elevation areas that were otherwise inaccessible due to snowpack during other years (Tucker 2019 pers. comm.). Although fisher occur across a wide range of precipitation levels and minimum temperatures, and appear able to utilize higher elevations in years with less snowpack, it is unknown how the interaction of vegetation, fire regimes, and competition with other species will influence future fisher occupancy patterns in a changing climate (Zielinski *et al.* 2017, p. 542–543).

The best available information indicates there is a link between changing climate conditions and the resulting changes to overall habitat suitability and availability for fishers throughout their range. There is also a link between changing climate conditions and the potential to increase fisher stress levels when habitat changes occur. More specifically, these changes affect the amount and distribution of habitat necessary for female fishers to be able to have places to den and raise their young. We provide three examples below.

First, ongoing climate change in California is likely to result in significant or amplified wildfire activity, with the area burned and fire severity likely to increase (Hurteau *et al.* 2019, pp. 1, 3; Moritz *et al.* 2018, p. 36). This in turn can result in reduced denning habitat availability for fishers (e.g., Sheehan *et al.* 2015, p. 20–22; Dalton *et al.* 2017, p. 46).

Second, under modeled increases in drought conditions, tree mortality and large-scale high-severity wildfire are likely to increase in frequency, size, and severity, especially if fuel loads in forests are not decreased (Young *et al.* 2017, p. 78; Westerling and Bryant 2008, pp. S244–S248; Abatzoglou and Williams 2016, pp. 11,770, 11,773; Bedsworth *et al.* 2018, pp. 29–30; Larvie *et al.* 2019, p. 1; Westerling 2018, pp. 21–23). Some models suggest that fire severity may be independent from fire intensity; thus, a lower-intensity fire could kill more trees if they are also experiencing a severe drought (Restaino and Safford 2018, p. 500). Although we can expect that future droughts may be more intense, it is unknown whether droughts in the future will be worse than our worst droughts in the past (Keeley and Syphard 2016, p. 6; Bedsworth *et al.* 2018, pp. 26, 57). Regardless, it appears that climate change is intensifying the effects of drought, given that changing climate conditions are estimated to have contributed 5 to 18 percent to the severity of one of the worst recent droughts in 20th-century California history (Williams *et al.* 2015, p. 6,819; Keeley and Syphard 2016, p. 6). The combination of drought and wildfire can result in loss of adequate forest-canopy cover and individual trees that provide habitat suitable for denning female fishers (e.g., CBI 2019a, p. 9).

Third, the observed increases in wildfire activity in Oregon and California are partially due to climate change; increasing wildfire activity is expected under future warming, which in turn can increase tree mortality from disease and insects like mountain pine beetles (Dalton *et al.* 2017, p. 46; Bedsworth *et al.* 2018, p. 64). Widespread tree mortality (climate related or not) is likely to result in fishers experiencing reduced fitness (e.g., a positive relationship between higher amounts of tree mortality and higher cortisol levels in fishers; Kordosky 2019, p. 14, 36) and an overall reduction in forest-stand conditions suitable for denning (CBI 2019a, entire; Green *et al.* 2019a, p. 3–4). Most forests will experience some form of climate stress by the late 21st century and higher temperatures will result in more droughts in California, revealing the interconnected nature of climate, wildfire, and tree mortality that collectively can shift forest composition and structure (Larvie *et al.* 2019, p. 12–14; Restaino and Safford 2018, p. 502) and further challenge the ability of fishers to locate suitable habitat.

Tree Mortality from Drought, Disease, and Insect Infestation

In our 2019 Revised Proposed Rule, this section was entitled "Forest Insects and Tree Diseases"; we have changed the title to more accurately describe the threat. Localized tree mortality from insect outbreaks and tree diseases are natural processes, and they provide structures used by fisher for rest and den site as well as their prey. However, wide-spread insect and disease outbreaks can alter the overall distribution and abundance of fisher habitat. For example, severe drought events in California since 2010, combined with insect outbreaks and tree diseases, have led to more than 147 million dead trees in California (CAL FIRE and USFS 2019, no page number). Although both the NCSO DPS and SSN DPS experienced tree mortality during the recent drought, the magnitude of this effect on the landscape differed tremendously between each DPS (CAL FIRE and USFS 2019, no page number). The highest levels of tree mortality occur in the southern Sierra Nevada due to increased susceptibility to forest insects and tree disease from the severe drought while most of the NCSO DPS experienced background levels (0-5 dead trees per acre) of tree mortality (CAL FIRE and USFS 2019, no page number; CTMTF 2020).

Vegetation Management

Vegetation management techniques of the past (primarily timber harvest) have been implicated as one of the two primary causes for fisher declines across the United States. Many fisher researchers have suggested that the magnitude and intensity of past timber harvest is one of the main reasons fishers have not recovered in the western United States as compared to the northeastern United States (Service 2014, pp. 54–56). At the time of the 2014 Proposed Rule, we stated that vegetation management techniques have, and can, substantially modify the overstory canopy, the numbers and distribution of structural elements available for use by fisher, and the ecological processes that create them. An increase in open areas, such as those resulting from timber harvest, may increase the risk of predation on fishers by bobcats and other predators that frequent these areas (see the Predation and Disease section below). Overall, fisher home ranges are comprised of mosaics of forest-stand types and seral (stand age) stages but often with a high proportion of mid- to late-seral forests (Raley et al. 2012, p. 231).

Fishers occupy managed landscapes and stands where timber harvest and other vegetation management activities occur; the degree to which fishers tend to be found in these areas often depends on a multitude of factors, including the scale, intensity, and rate of activities; the composition and configuration of suitable habitat, and the amount and type of retained legacy structures (Service 2016, pp. 59–60; Thompson and Clayton 2016, pp. 11–16, 22; Niblett et al. 2017, pp. 14–17; Marcot et al. 2018, p. 400; Powell et al. 2019, entire; Parsons 2018, pp. 31, 53–55, 63; Purcell et al. 2018, pp. 60–61, 69–70). Fishers tolerate some clearcuts in their home ranges, though the mean proportion tends to be below 25 percent of their home-range area (Powell et al. 2019, p. 23). Fishers are also observed denning in areas where as much as 25 percent of the area near the den sites is in openings (Niblett et al. 2017, p. 17). Some level of open areas or younger stands may provide suitable prey for fishers (Parsons 2018, pp. 26–29, 53–55). Yet even in these situations, fishers are associated with forests that contain structures associated with older forests, such as complex canopies, down wood, hardwoods, and trees with microsites conducive to denning, resting, or supporting prey (Niblett et al. 2017, pp. 16–17; Powell et al. 2019, pp. 19-23). Therefore, for vegetation management it is important to maintain decadent structures that serve as den and rest trees and that likely required much time and site-specific conditions to develop (Matthews et al. 2019, pp. 1,313). Overall, it appears fishers can tolerate management activities that promote forest heterogeneity (variation) and that consider the natural range of variation in forest structure, distribution, and composition when identifying and protecting valuable habitat elements (Thompson et al. 2019b, pp. 13–14).

While historical loss of mature and older forests via timber harvest through much of the 1900s resulted in a substantial loss of fisher habitat in California and Oregon, harvest volume has sharply declined throughout this area since 1990, primarily on Federal lands, but also on non-Federal lands. Although timber harvest is still ongoing throughout the NCSO and SSN DPSs, habitat ingrowth (i.e., forest stands becoming habitat as a result of forest succession) is also occurring, offsetting some of those losses. We address this for each of the DPSs below.

<u>Exposure to Toxicants</u>

Wildlife can encounter a wide range of chemicals in the environment. Fertilizers and pesticides (e.g., herbicides, insecticides, and rodenticides) are among the most common chemicals wildlife are exposed to and impacted by, especially near urban and agricultural areas. Of these chemicals, the rodenticides are the longest lasting and therefore the easiest to test for, track, and understand impacts to species. Both the draft and final Species Reports detail the exposure of fishers to rodenticides in Oregon and California (Service 2014, pp. 149–166; Service 2016, pp. 141–159).

The rodenticides impacting fishers include first- and second-generation anticoagulant rodenticides and neurotoxicant rodenticides. First-generation anticoagulant rodenticides are in a bait form that rodents consume for several consecutive feedings (i.e., sublethal doses) to deliver a lethal dose. Second-generation rodenticides are significantly more potent than first-generation rodenticides, and a lethal dose can be ingested in a single feeding. Additionally, second-generation rodenticides are more likely than first-generation rodenticides to poison predatory wildlife (e.g., fishers) that eat live or dead poisoned prey because they are more persistent in the environment. Neurotoxicant rodenticides are delivered in either single or multiple doses and have highly variable potency (multiple hours or days). Both first- and second-generation anticoagulant rodenticides as well as neurotoxicant rodenticides are used to kill small mammals that are destroying crops. Rodenticides impair an animal's ability to produce several key blood-clotting factors (anticoagulant rodenticides) or affect brain and liver function (neurotoxicant rodenticides). Anticoagulant rodenticide exposure causes bleeding from the nose and gums, extensive bruises, anemia, fatigue, difficulty breathing, and also damage to small blood vessels, resulting in spontaneous and widespread hemorrhaging.

A sublethal dose of a rodenticide can produce significant clotting abnormalities and hemorrhaging, leading to a range of symptoms, such as difficulty moving and a decreased ability to recover from physical injury. Ingestion of the neurotoxicant bromethalin has fast-acting and physical effects such as unsteadiness and weakness, and at higher dosage levels, seizures. Both anticoagulant and neurotoxicant rodenticides can change or impede normal fisher movement and foraging behaviors and therefore may increase the probability of mortality from other sources such as predation or vehicle collision. In addition, anticoagulants bioaccumulate and become increasingly prevalent in predators as they continue to eat contaminated prey they accumulate more and more anticoagulant (Lopez-Perea and Mateo 2018, p. 165). Contaminated rodents are found within and adjacent to treated areas weeks or months after bait application (Geduhn et al. 2014, pp. 8–9; Tosh et al. 2012, pp. 5–6; Sage et al. 2008, p. 215).

Rodenticide use in agricultural or urban areas is common and wildlife exposure rates can be high. For example, in California 70 percent of tested mammals were positive for at least one anticoagulant rodenticide (Hosea 2000, p. 238). And across the world, 58 percent of tested predators were positive for anti-coagulant rodenticides (Lopez-Perea and Mateo 2018, p. 172). Not surprisingly, mammals are most impacted by rodenticides, when compared to birds, reptiles, and insects; and generalist species that eat a variety of prey species are more likely to be contaminated relative to specialist species that feed on one or a few species (Lopez-Perea and Mateo 2018, pp. 163, 173).

Predators that are (a) nocturnal, (b) opportunistic in feeding habitats where rodents are an important part of their diet, and (c) nonmigratory and live close to or within landscapes that are heavily impacted by human activities are more likely to be exposed to rodenticides and have relatively high liver-residue concentrations of multiple rodenticide compounds (Hindmarch and Elliott 2018, p. 251). Because fishers are territorial, nonmigratory mammals, and females remain particularly tied to their territories (Arthur et al. 1993, p. 872), they are among the species that are more vulnerable to rodenticide exposure. Additionally, fisher diets consist primarily of small mammals (Golightly et al. 2006, entire), which are the target species for rodenticides (Gabriel et al. 2015, entire; Thompson et al. 2014, pp. 97–98). Top predators within the range of fishers, including northern spotted owls and barred owls, have also been exposed to rodenticides (Franklin et al. 2018, p. 1; Gabriel et al. 2018, p. 1).

Data available since completion of the final Species Report in 2016 continue to document exposure and mortalities to fishers from rodenticides in both the NCSO and SSN DPSs (Gabriel and Wengert 2019, unpublished data, entire; Powell et al. 2019, p. 16). Here we discuss data specific to both the NCSO and SSN DPS, and below we provide more DPS-specific information. Fisher carcasses have been collected and tested for their cause of death and their exposure to rodenticides (Gabriel and Wengert 2019, unpublished data). Data for 97 fisher carcasses collected in California in the period 2007–2014 indicate 81 percent of fishers tested positive for one or more rodenticides; and 48 fishers collected from 2015–2018 indicate 83 percent tested positive (Gabriel and Wengert 2019, unpublished data). Mortalities due to rodenticide toxicosis have increased from 5.6 to 18.7 percent since collection and testing of fisher mortalities began in 2007 (Gabriel and Wengert 2019, unpublished data). And, from 2015 to 2018, additional fisher mortalities due to both anticoagulant and neurotoxicant rodenticides have been documented, including the toxicosis of neonatal kits in the womb (Gabriel and Wengert 2019, unpublished data, p. 4). The probability of fisher mortality increases with the number of anticoagulant rodenticides a fisher has been exposed to, and most fishers are exposed to more than one (Gabriel et al. 2015, p. 15).

The primary source of rodenticide exposure to fishers is from illegal marijuana grow sites on public, private, and tribal lands in California and Oregon (Gabriel et al. 2015, pp. 14–15; Thompson et al. 2014, pp. 97–98). In the mid- to late 1970s, 90 percent of the marijuana consumed in the United States came from abroad (Brady 2013, pp. 50-57). Marijuana cultivation in California really began in 1974 or 1975, and by 1979, 35 percent of the marijuana consumed in California was from California (Brady 2013, pp. 50-57) By 2010, 79 percent of all the marijuana consumed in the United States came from California (Brady 2013, pp. 50-57).

Information on the amount and types of rodenticides have been collected at over 300 illegal grow sites in California from 2012–2018 (Gabriel and Wengert 2019, unpublished data, pp. 5–7). Through this time period the use of second-generation rodenticides decreased. This is likely because of policy changes in 2014 that placed additional restrictions on the use of second-generation rodenticides in California. The change in policy has led to a more intensive use of first-generation anticoagulant rodenticide and the highest amount of neurotoxicant rodenticide use since 2012 (Gabriel and Wengert 2019, unpublished data, pp. 5–7).

In order to evaluate the risk to fishers from illegal grow sites and any differences between populations, we use a Maximum Entropy model to identify high and moderate likelihood of illegal grow sites being located within habitat selected by fisher in California and Oregon (Gabriel and Wengert 2019, unpublished data, pp. 7–10). This model indicates that 44 percent of the habitat modeled (combined NCSO and SSN DPSs) for fishers is within areas of high and moderate likelihood for illegal grow sites—see also the individual DPS sections below. However, the extent to which the use of toxicants occurs on marijuana grow sites on private land, as well as other agricultural, commercial, and public land sites within the range of the fisher (and habitats that fishers select for), is unknown.

Illegal grow sites are regularly discovered in California (617 from 2012-2018, and 2,039 from 2004-2018) (Gabriel and Wengert 2019, unpublished data, p. 7). Law-enforcement specialists estimate they locate and raid roughly 20 to 40 percent of sites each year and only about 10 percent of those are remediated (Thompson et al. 2017, p. 45). If these estimates are accurate, it is reasonable to conclude that thousands of illegal grow sites—known and unknown, and with an undetermined amount of toxicants present—remain scattered within both the NCSO DPS and SSN DPS (Gabriel et al. 2015, entire; Thompson et al. 2017, p. 45). Rodenticides persist in the landscape, with first-generation rodenticides having a half-life of up to 16 days and second generation rodenticides having a half-life up to 307 days (Shore and Coeurdassier 2018, p. 146).

As discussed, both the draft and final Species Reports detail the exposure of fishers to rodenticides (Service 2014, pp. 149–166; Service 2016, pp. 141–159). Below we summarize new information:

(1) *Rodent diversity*—Rodent diversity at illegal grow sites that were treated with rodenticides contained only mice, as compared to untreated sites where rodenticides were not used and where larger-bodied rodents (e.g., woodrats, squirrels, chipmunks) were located. These larger-bodied rodents are the prey species fishers prefer (Gabriel et al. 2017, p. 10). The comparison suggests larger-bodied rodents may be impacted by rodenticides more than smaller bodied rodents. Further, illegal grow sites may act as "sinks" for prey moving in from neighboring areas meaning less prey is available for fisher (Gabriel 2018, pers. comm).

(2) *Law Enforcement Activities* —During the "Operation Forest Watch, Department of Justice" campaign in California between October 2017 and September 2018, more than 20,000 pounds of fertilizer, pesticides, and chemicals were removed from 160 illegal grow sites (Department of Justice (DOJ) 2018, p. 2). Of these, 89 percent were confirmed or strongly suspected to have carbofuran or methamidophos (i.e., insecticides (non-rodenticides) that cause central nervous system dysfunction), up from the previous year's total of 75 percent (DOJ 2018,

p. 2). Estimates vary of the number of illegal grow sites that necessitate reclamation of toxicants, but as of 2018, 766 known illegal grow sites are still in need of reclamation (DOJ 2018, p. 2).

(3) *Effect of legalization*—Since the 2014 Proposed Rule, recreational marijuana cultivation and use became legal in Oregon (2015) and California (2016). The data are mixed with respect to how legalization is affecting illegal grows sites on public lands. Some studies find that illegal grow sites on National Forests have decreased in States where marijuana was legalized (Klassen and Anthony 2019, p. 39; Prestemon et al. 2019, p. 1). Conversely, many law-enforcement officials have found no indication that illegal grow sites have decreased with cannabis legalization, and it may in fact be increasing, in part due to legalization providing an effective means to launder illegal marijuana (Hughes 2017, entire; Bureau of Cannabis Control California 2018, pp. 28, 30; Sabet 2018, pp. 94–95; Fuller 2019, no page number; Klassen and Anthony 2019, p. 45). Data from fisher monitoring suggests that illegal grow sites are dropping in number but are getting larger (impacting more fisher home ranges) (Gabriel 2018, pers comm). And, law-enforcement actions have caused illegal grow sites to disperse further, which makes them more difficult to locate (Gabriel 2018, pers comm.). Other uncertainties make it difficult to reach conclusions about trends in the abundance and frequency of illegal grow sites this soon after legalization, including legal marijuana market forces, the clandestine nature of the black market, federal illegality and trends of legalization in other States, State taxation of marijuana, local employment and economic conditions, and regulatory and law enforcement responses (Hughes 2017, entire; Bureau of Cannabis Control California 2018, pp. 28, 30; Sabet

2018, pp. 94–95; Fuller 2019, no page number; Klassen and Anthony 2019, pp. 45–46; Prestemon et al. 2019, pp. 9–11).

Legalization has resulted in an increase in legal marijuana cultivation. At this time, we have limited data about the prevalence of rodenticide use on legal private grow sites and whether fishers are at risk from rodenticide use on private land. In urban-wildland interfaces, or where private lands abut public forestland or occur as inholdings, legal grow sites are more likely within fisher home ranges (e.g., Franklin et al. 2018, p. 3).

(4) *Reclamation Efforts*—Existing law enforcement cannot keep up with illegal marijuana activities (Bureau of Cannabis Control California 2018, p. 30; Wendt 2019, pp. 4–6). In addition, support from States and local governments to Federal law enforcement on public lands (e.g., USFS) has dwindled in an effort to redirect resources to regulate the legalized marijuana industry (Bureau of Cannabis Control California 2018, p. 30; Klassen and Anthony 2019, p. 45).

The Medical Marijuana Regulatory and Safety Act of 2016 specifies that, after control and regulation of the program, 20 percent of the marijuana tax fund shall be given to CDFW for 1) cleanup, remediation, and restoration on environmental damage in watersheds affected by marijuana cultivation (a portion of which may be distributed through grants), and 2) the stewardship and operation of state-owned wildlife habitat areas and state park units to prevent illegal cultivation, and use (Comprehensive Medical Cannabis Regulation and Safety Act 2016, pp. 43-44). This language is not included in the 2017 Medicinal and Adult-Use Cannabis Regulation and Safety Act (MUCRA) that updates the 2016 Act (MUCRA 2017, entire).

In 2017, CDFW used their Regulation and Forest Restoration funds for their newly formed Cannabis Restoration Grant Program in 2017 (CDFW 2017a, p. 3). The program funded the restoration of watersheds impacted by marijuana cultivation, including removing trash and equipment, diversion removal, riparian enhancements, and streambank stabilization (CDFW 2017b, p. 1). Funds for projects in 2017 totaled $1,300,000 (CDFW 2017a, p. 1). Monies from this program went to fund four efforts for watersheds within the range of the NCSO DPS (CDFW 2017a, p. 2). Monies were not made available in 2018 or 2019 but it is our understanding there are plans to add monies to this grant program in the future.

The CROP Project (Cannabis Removal on Public Lands) is a citizen-based organization established in 2018 with the primary goals of: (1) Securing and increasing State and Federal resources for illegal-grow-site reclamation; (2) increasing USDA U.S. Forest Service (USFS) law enforcement and overall presence on National Forests; and (3) implementing a statewide public education campaign, focusing on the human health risks associated with ingesting unregulated marijuana (www.cropproject.org). Successful accomplishment of these goals could substantially improve the discovery and reclamation of illegal grow sites, but it is too early to determine the degree to which this program reduces the threat of toxicants to fishers.

Please also see our Existing Regulatory Mechanisms in both the NCSO and the SSN DPS discussions below for more information on voluntary conservation efforts that address illegal grow sites.

At this time, our evaluation of the best available scientific and commercial information regarding toxicants and their effects on fishers leads us to conclude that individual fishers within both DPSs have died from toxicant exposure, fishers suffer a variety of sublethal effects from exposure to rodenticides, and the potential for illegal grow sites within fisher habitat is high. The exposure rate of more than 80 percent of fisher carcasses tested in California has not declined between 2007 and 2018 (Gabriel and Wengert 2019, unpublished data, pp. 3–4), while poisoning has increased since 2007 (Gabriel et al. 2015, p. 7). We do not know the exposure rate of live fishers to toxicants since this information is difficult to gather and has not been collected. In addition, the minimum amount of anticoagulant and neurotoxicant rodenticides required for sublethal or lethal poisoning is unknown. Specific information on fishers and toxicants within the NCSO DPS and the SSN DPS is described in the DPS-specific sections below.

Potential for Effects Associated With Small Population Size

Small populations are vulnerable to a rapid decline in their numbers and localized extinction due to the following: (1) loss of genetic variability (e.g., inbreeding depression, loss of evolutionary flexibility), (2) fluctuations in demographic parameters (e.g., birth and death rates, population growth rates, population density), and (3) environmental stochasticity or random fluctuations in the biological (e.g., predation, competition, disease) and physical environment (e.g., wildfire, drought events, flooding) (Primack 2014, pp. 252–268). We note that forest carnivore populations, including fisher, are often isolated and generally occur in low densities (Service 2016, p. 29). While we do not have data across the entire fisher range on the West Coast demonstrating that fishers are exhibiting specific effects associated with small population size, consideration of these three elements along with life-history traits can provide an extinction-vulnerability profile for both the NCSO DPS and SSN DPS. Fishers in the Oregon and California are currently restricted to two historically extant indigenous populations (NCSO and SSN), one extant reintroduced subpopulation (NSN, established with fishers from NCSO), and one subpopulation established with fishers from outside this region (SOC). We recognize the two geographic areas of fisher, SSN and NCSO, (the latter of which includes the SOC and NSN for this analysis), are geographically isolated from one another with no evidence of and very little opportunity for genetic interchange. Our evaluation of the best scientific and commercial information available indicates that the separation of the SSN and NCSO populations occurred a very long time ago, possibly on the order of more than a thousand years, pre-European settlement (Tucker *et al.* 2012, pp. 1, 7; Knaus *et al.* 2011, p. 11). Despite their isolation and the small size of the SSN DPS, the native NCSO DPS and SSN DPS have persisted over a long period of time.

At this point in time, fishers in both the NCSO DPS and SSN DPS are reduced from their original/historical range within the West Coast states. The best available information suggests these populations are expected to remain isolated from one another (as has been apparent since pre-European settlement). Estimates of fisher population growth rates for the NCSO DPS and the portion of the SSN DPS surveyed do not indicate any overall positive or negative trend (see Current Condition section for the NCSO DPS below), with the exception of the recently reintroduced Stirling subpopulation in the NSN, which has steadily grown since its translocation beginning in 2009. The vulnerabilities related to small population size for each DPS are further described below.

<u>Disease and Predation</u>

We evaluated information on disease and predation in our 2016 Species Report (Service 2016, pp. 128-132). In addition, we evaluated the following new information available regarding disease or predation since the time of our 2014 Proposed Rule (e.g., Gabriel *et al.* 2015, pp. 5-8, 12-16; Sweitzer *et al.* 2016a pp. 444-448; IERC 2017, p. 2; Barry 2018, pp. 39-40; Green *et al.* 2018a, p. 549; Purcell *et al.* 2018, pp. 39-40, 50-51, 53, 72; CDFW 2019, entire). Although we did not analyze this threat in the 2019 Revised Proposed Rule, this new information warrants consideration in this Final Rule, particularly because we analyzed each DPS separately as we expect these threats are likely to act differently based on population size. Predation and disease are the two greatest sources of mortality for fishers of identified mortality sources studied in California (Gabriel *et al.* 2015, p. 6; Sweitzer *et al.* 2016a, p. 447). Of 183 California fishers where the mortality source was identified, 67 percent died from predation and 13 percent from a combination of disease, injury, or starvation (Sweitzer *et al.* 2016a, p. 447). Gabriel *et al.* (2015, p. 7) was able to separate disease from other mortality sources and found that 15 percent of 136 necropsied fishers died of disease.

Several viral and bacterial diseases are known to affect mustelids, including fishers. Known diseases that have caused fisher mortality in the area of the NCSO and SSN DPSs include canine distemper virus, *Toxoplasma gondii* (a protozoal infection), and several bacterial infections (Gabriel *et al.* 2015, pp. 7-8; see Service 2016, pp. 128-130 for diseases summary). Disease only has a minor impact where it has been studied in the SSN DPS (Spencer *et al.* 2015, p. 66), and it comprises a substantially smaller portion of fisher mortalities compared to predation.

We do not know if current predation rates are similar to historical rates in the area of the NCSO DPS and SSN DPS. Comparing predation rates to populations outside of the West Coast is not informative because most of those populations are trapped, skewing the mortality source results (e.g., Lofroth *et al.*, 2010, p. 62, Table 6.3). Recent research in California suggests that landscape changes as a result of disturbances over the past century may have altered the carnivore community and affected predation rates on fishers by bobcats (Wengert 2013, pp. 59–66, 93, 97–100) where an increased proximity to open and brushy areas (vegetation selected for by bobcats) increases the risk of predation on fishers. Mountain lions and bobcats are major predators of fishers. Of 90 fishers that died from predation or were killed by other animals, 90 percent were killed by members of the cat family (Felidae) (Gabriel *et al.* 2015, p. 5). Sublethal effects of toxicants may also result in higher than normal mortality rates associated with disease and predation, but we do not know what portion of identified mortalities would not have occurred but for the presence of sublethal levels of toxicants in the individual (Gabriel *et al.* 2015, p. 16; Sweitzer *et al.* 2016a, p. 448).

Disease and predation are naturally occurring sources of mortality, although the associated mortality rates may be increased by human-caused factors such as vegetation management or toxicants (Gabriel *et al.* 2015, pp. 14, 16). Predation has been identified as the most important factor limiting fisher populations in California (Sweitzer *et al.* 2016a, p. 448). High levels of predation may explain why fisher populations have not expanded into unoccupied suitable habitat throughout much of the NCSO and SSN DPSs (Gabriel *et al.* 2015, p. 16). However, the reintroduced NSN subpopulation appears to be growing despite mortalities due to predation, indicating that other factors such as fisher dispersal distance through unsuitable habitat may also limit fisher expansion (Powell and Zielinski 1994, pp. 60–61; Aubry and Lewis 2003, p. 88) and that reintroductions can play an important role in recovery for the species (Green *et al.* 2020, p. 13).

Vehicle Collisions

Fisher collisions with vehicles have been documented at multiple locations within the NCSO DPS and SSN DPS. We summarize this information in the final fisher Species Report (Service 2016, pp. 137–138). Although we did not analyze this threat in the 2019 Revised Proposed Rule, this information warrants consideration in this Final Rule, particularly because we expect this threat to act differently in the NCSO DPS and SSN DPS based on population size and proximity to human development. In general, fisher collisions with vehicles documented in California are relatively rare, representing <2 percent of documented mortalities (Gabriel *et al.* 2015, p 15). And, vehicle-related mortalities may be a more local concern associated with specific high-traffic areas (Gabriel *et al.* 2015, pp. 7 and 15, Table 2).

Existing Regulatory Mechanisms

Many Federal and State existing regulatory mechanisms provide a benefit to fishers and their habitat. For example, trapping restrictions have substantially reduced fisher mortality throughout the NCSO DPS and SSN DPS of fisher. In some places, forest-management practices are explicitly applied to benefit fishers or other species with many similar habitat requirements, such as the northern spotted owl. State and Federal regulatory mechanisms have abated the large-scale loss of fishers to trapping and minimized the loss of fisher habitat, especially on Federal land (Service 2014, pp. 117–141). Additionally, rodenticides are regulated under Federal and State laws. However, fishers are still exposed to rodenticides where they are used (see NCSO and SSN DPS specific sections on Exposure to Toxicants and Existing Regulatory Mechanisms).

Finally, voluntary conservation measures are in place that provide a benefit to fishers and their habitat. These measures include Habitat Conservation Plans (HCPs), Candidate Conservation Agreements with Assurances (CCAAs), Safe Harbor Agreements (SHAs), Memorandum of Understandings (MOUs), and other conservation strategies, as described for each DPS below (see NCSO and SSN DPS specific sections on Voluntary Conservation Measures below).

Final Listing Determination for NCSO DPS of Fisher

Current Condition

The NCSO DPS comprises a mix of ownerships, with similar amounts of private and Federal ownership (Table 1). The Forest Service is the predominant Federal land manager within the DPS.

Table 1. Land ownership or management for the Northern California / Southern Oregon Distinct Population Segment of fisher.

	California (CA)		**Oregon (OR)**		**NCSO Total**	
Agency	**acres (ac)**	**percent (%) for CA**	**ac**	**% for OR**	**ac**	**%**
Bureau of Land Management	864,221	4.0	945,910	17.8	1,810,130	6.8
Forest Service	8,433,567	39.5	2,332,813	43.8	10,766,380	40.4

Bureau of Indian Affairs	211,998	1.0	72	0.0	212,070	0.8
National Park Service	353,235	1.7	186,934	3.5	540,170	2.0
State and Local	473,997	2.2	20,637	0.4	494,635	1.9
Private	10,951,353	51.3	1,824,961	34.3	12,776,315	47.9
Total Acres*	21,346,412	100.0	5,327,797	100.0	26,674,209	100.0

* Acres and % may not sum due to rounding and because some other owners with less land are not included.

Population condition and abundance information for the NCSO DPS is presented for three different geographic portions of this DPS. First, the SOC portion west and south of Crater Lake in the Southern Oregon Cascade Range is predominantly represented by reintroduced individuals from British Columbia and Minnesota. However, recent analyses have documented that at least some of these reintroduced SOC individuals and native NCSO individuals are overlapping in range, with confirmed interbreeding (Pilgrim and Schwartz 2016, entire; Pilgrim and Schwartz 2017, entire). Second, the NSN portion is represented by native, reintroduced fishers whose genetic stock is from fishers relocated from the Klamath-Siskiyou and Shasta-Trinity subregions (in the historically native NCSO DPS). These animals were relocated into the northern Sierra Nevada. This geographic portion of the NCSO DPS occurs on land known as the Sierra Pacific Industries (SPI) Stirling Management Unit in Butte, Plumas, and Tehama Counties, California (Powell et al. 2019, p. 2). Third, the remainder of the native fishers in the

NCSO DPS occupy the Klamath-Siskiyou Mountains in southern Oregon and northern California, the California Coast Range Mountains, the Shasta-Trinity subregions in northern California, and the western portion of the southern Cascades in northern California.

Fishers in the SOC portion of the NCSO DPS stem from a translocation of 30 fishers from British Columbia and Minnesota to the southeastern Cascade Range and west of Crater Lake between 1977 and 1981, after an earlier reintroduction in 1961 failed (Aubry and Lewis 2003, p. 84; Lofroth et al. 2010, pp. 43–44). Based on survey and research efforts starting in 1995, genetic evidence shows these fishers continue to persist (Drew et al. 2003, p. 57; Aubry et al. 2004, pp. 211–215; Wisely et al. 2004, p. 646; Pilgrim and Schwartz 2014–2017, entire; Moriarity et al. 2017, entire; Barry 2018, pp. 6, 22–24; Moriarty et al. 2019, p. 23).

Prior to 2015, survey work in the Oregon Cascades north of the NCSO DPS was limited to opportunistic or small-scale efforts. Verifiable fisher detections did not exist, except for two single fishers: one just north of the SOC subpopulation in 2014 (Wolfer 2014, pers. comm.) and a single dispersing juvenile male detected in the same general area in the 1990s (Aubry and Raley 2006, p. 5); this suggests occasional individuals may disperse north through the central Oregon Cascades. Over the winter of 2015–2016, systematic camera surveys occurred in the northern Oregon Cascades (specifically, the southern portion of the Mt. Hood National Forest and northern portion of the Willamette National Forest). No fishers were detected (Moriarty et al. 2016, entire), suggesting fishers may not reach this far north in the Oregon Cascades. Additionally, surveys over the past 3 years have not detected fishers north of the Rogue River in the central Oregon Cascades (Barry 2018, pp. 22–23) (see below).

Information is not available on population size for the SOC portion of the NCSO DPS. In the northern portion of the SOC area, fishers were detected in the northern and eastern portions of Crater Lake National Park between 2013 and 2015 (Mohren 2016, pers. comm.). Outside of the Park, large-scale systematic surveys were conducted in 2016 and 2017 north and west of Crater Lake National Park and south to the Klamath Falls Resource Area (KFRA; south of the reintroduction area) of the Bureau of Land Management (BLM) Lakeview District (Barry 2018, entire). Few fishers were detected in an area west of Crater Lake National Park where fishers were captured and radio-collared in the early 1990s by Aubry and Raley (2002, entire). Within the Klamath Plateau (generally the KFRA area described above, but including surrounding non-Federal lands), Moriarty et al. (2019, pp. 5, 21) identified 31 to 41 individuals from 2015 to 2018, concluding that fishers in the SOC area do not appear to be expanding from where they were initially reintroduced. In comparing his range estimate with a coarse baseline range estimate provided by the Service, Barry (2018, pp. 22-24) determined that there was a 67 percent range reduction for the SOC subpopulation, concluding that SOC fishers "appear to have contracted, shifted south, or the previous population extent was incorrectly estimated" (Barry 2018, pp. 22–24). The author, however, urged caution when comparing his analysis with the baseline range estimate provided by the Service, and we agree. Our baseline range estimate used by Barry (2018, p. 31, Figure 3) was derived by encompassing verifiable fisher locations since 1993 in southwest Oregon. Our boundaries were based on modeled fisher habitat and readily identifiable features such the Rogue River. These range maps included scattered, disjunt detections with intervening areas of few to no fisher detections (e.g., see Service 2016, p. 34, Figure 7); consequently, our range map likely encompassed areas with limited fisher occurrence.

Hence, comparing our coarse range map with Barry's fisher distribution, which was quantitatively modeled from systematic detection surveys to delineate areas with a higher probability of fisher occurrence, should indeed be interpreted with caution. Thus, we conclude that a 67 percent range reduction overestimates any change in fisher distribution in the SOC subpopulation. We concur that SOC fishers seem to have shifted their distribution, and acknowledge that their distribution may be contracting to some degree. Furthermore, we acknowledge Barry's (2018, pp. 22-24) assertion that the SOC subpopulation has had ample time since their reintroduction to colonize beyond the reintroduction area and has failed to do so, suggesting that either our understanding of suitable habitat may be incorrect, there may be unknown barriers limiting their distribution, or other factors may limit this subpopulation.

Barry (2018, p. 23) also concluded that the SOC subpopulation appears small and relatively isolated given the number and spacing of detections. However, there is interbreeding with indigenous fishers near the Klamath Plateau area, suggesting fishers in the southern part of the SOC subpopulation are not isolated.

Fishers in the NSN portion of the NCSO DPS stem from a 2009 to 2011 translocation of 40 fishers (24 females, 16 males) from Humboldt, Siskiyou, and Trinity Counties, California, to the SPI Stirling Management Unit. Ongoing monitoring has confirmed that fishers born onsite have established home ranges and have successfully reproduced. Trapping efforts in the fall of 2017 as part of ongoing monitoring of the reintroduced subpopulation indicate a minimum of 61 fishers (38 females, 23 males), which is 21 more than were originally introduced (Powell *et al.* 2019, p. 2). Overall, 220 individual fishers were identified between 2009 and 2017 with a young age structure, suggesting healthy reproduction and recruitment (Powell *et al.* 2019, p. 2).

Although the subpopulation appears to be stable or growing, statistical conclusions will be difficult to draw until year 10 in 2020 (Powell *et al.* 2019, p. 2). The authors also concluded that the subpopulation is unlikely to go extinct in the next 20 years, barring dramatic decreases in survival and reproduction caused by stochastic events. We also recently received a draft manuscript concluding that estimated recruitment and survival probability of fishers in the Stirling subpopulation area "had stabilized and were quite high, indicating that this new population of fishers may be self-sustaining" (Green *et al.* 2020, p. 11).

Older estimates for the NCSO DPS (minus SOC and NSN) using various methodologies range from a low of 258–2,850 individuals, based on genetic data (Tucker *et al.* 2012, pp. 7, 9–10), to a high of 4,018 individuals based on extrapolation of data from two small study areas within the NCSO DPS to the entire NCSO DPS (Self *et al.* 2008, pp. 3–5). In 2017, a new estimate was developed for the NCSO DPS that includes southern Oregon and coastal California but still excludes SOC and NSN (Furnas *et al.* 2017, pp. 2–3). This study used detection/non-detection survey data from across much of the NCSO DPS to calculate an average density of 6.6 fishers per 39 mi^2 (100 km^2) across the area they defined for the NCSO DPS (Furnas *et al.* 2017, pp. 12–15). Using this estimate of fisher density, the NCSO DPS is estimated to be 3,196 individuals (2,507–4,184; 95 percent Confidence Interval (C.I.)) and fishers were detected at 41 percent of 321 paired camera stations (Furnas *et al.* 2017, pp. 10, 12). Density models indicate a core area of predicted high density (>10 fishers per 39 mi^2 (100 km^2) from between about 25 to 50 mi (40 to 80 km) inland from the coast in the California Coast Range and southern Klamath Mountains in California (Furnas *et al.* 2017, pp. 12-13). CDFW determined in their status assessment for fishers in California that the assessment done by Furnas, when applied to fishers in the California portion of NCSO, suggests that fishers are common and widespread (estimated to occur at 60 percent of sample units in California) (CDFW 2015, p. 55).

The indigenous population of fishers in Oregon was estimated to have a 26 percent range reduction compared to verifiable fisher records collected since 1993 (Barry 2018, p. 22). However, the author notes this comparison should be treated with caution, and we elaborate further on this analysis earlier in this section, concluding that the stated range reduction overestimates any change in the distribution of the indigenous fishers in Oregon..

Trend information for fishers within the NCSO DPS is based on the following two long-term study areas. As indicated above, we now consider the NCSO DPS to include the areas previously represented as the SOC and NSN reintroduced fisher subpopulations.

The Hoopa study area is approximately 145 mi^2 (370 km^2) on the Hoopa Valley Indian Reservation north of California State Highway 299 and near Highway 96, which is largely surrounded by the Six Rivers National Forest and other private lands. The study area represents the more mesic portion (containing a moderate amount of moisture) of the NCSO DPS. Fisher studies have been ongoing since 1996. The population trend in the period 2005–2012 indicates declining populations with lambda of 0.992 (C.I. 0.883–1.100) with a higher lambda rate for females 1.038 (0.881–1.196) than males 0.912 (0.777–1.047) (Higley et al. 2014, p. 102, Higley 2015, pers. comm.). The authors concluded that, “the population as a whole is essentially stable” (Higley et al. 2014, p. 31), but they raised concerns about declines in survival of males over the last 3 years of the study; they believed the decline was associated with toxicant poisoning associated with illegal marijuana growing and that males were at a higher risk because of their larger home ranges compared to females (Higley et al. 2014, pp. 32, 38).

The Eastern Klamath Study Area (EKSA) is approximately 200 mi^2 (510 km^2) in size straddling the California/Oregon border. This study area represents the more xeric portion (containing little moisture; very dry) of the NCSO DPS. Monitoring has occurred since 2006 (Green *et al.* 2018b, entire). The estimate for population growth rate in the period 2006–2013 is increasing (lambda = 1.06; C.I. 0.97–1.15) (Powell *et al.* 2014, p. 18). Fishers in this study area were a source for translocating fishers to the Stirling reintroduction site elsewhere in the DPS. Nine fishers removed over a two-year period (equivalent to 20 percent of the population) did not affect fisher abundance or density in the study area (Green *et al.* 2017, p. 9).

After fires in this study area in 2014, the estimated number of fishers declined by 40 percent from the year before the fire (Green *et al.* 2019b, p. 8). Prior to the fire, this population varied in the annual number of fishers and lambda trends (increasing or decreasing) (Green *et al.* 2016, p. 15, Table 1) (Table 2), indicating the population was stable, as stated by the authors (Green *et al.* 2016, p. 8). Modeling results suggest the post-fire decline was because of the fire. Although the fire notably affected fishers in this population in the 2 years immediately following, the fate of the fishers affected by the fire is unknown; it is possible that some fishers may have emigrated out of the burned areas (Green *et al.* 2017, pp. 9-10) or may reoccupy areas that burned at lower severities in the future. Credible intervals of post-fire and pre-fire fisher numbers overlap, though the post-fire estimate is on the lower end of the pe-fire estimates.(Green *et al.* 2019b, p. 18; Matthews and Green 2020, pers. comm.). Data since 2016 have not yet been analyzed to assess the EKSA population trend over the past few years.

In the absence of limiting factors, populations tend to steadily increase (lambda >1) until the population growth becomes restricted. Within the NCSO DPS, this has been occurring in the

Stirling reintroduced population as it expands to fill available habitat (Powell et al. 2019, pp. 2, 4) Healthy populations will then naturally fluctuate around their upper limit, or carrying capacity, increasing in some years and decreasing in other years (Figure 2). This is exhibited in the data from the EKSA, where annual estimates of abundance for fishers have varied, yielding increasing and decreasing growth rates from year to year prior to the 2014 fires (Table 2). This is consistent with normal variation for populations that are neither growing nor declining, but fluctuating near carrying capacity. For both the Hoopa and the EKSA studies, the authors' use of the term "stable" (Higley *et al.* 2014, p. 31; Green *et al.* 2016, p. 8) implies that the lambda rates are not swinging dramatically from year to year, but rather annual abundance estimates are fluctuating around a steady value consistent with normal population variation. There are still uncertainties regarding the post fire declines from the EKSA study area (addressed below in Wildfire and Wildfire Suppression section) as well as the reduced male survival rates in the Hoopa study area. However, the best available data suggests that populations are exhibiting variability that may be consistent with populations at or near carrying capacity.

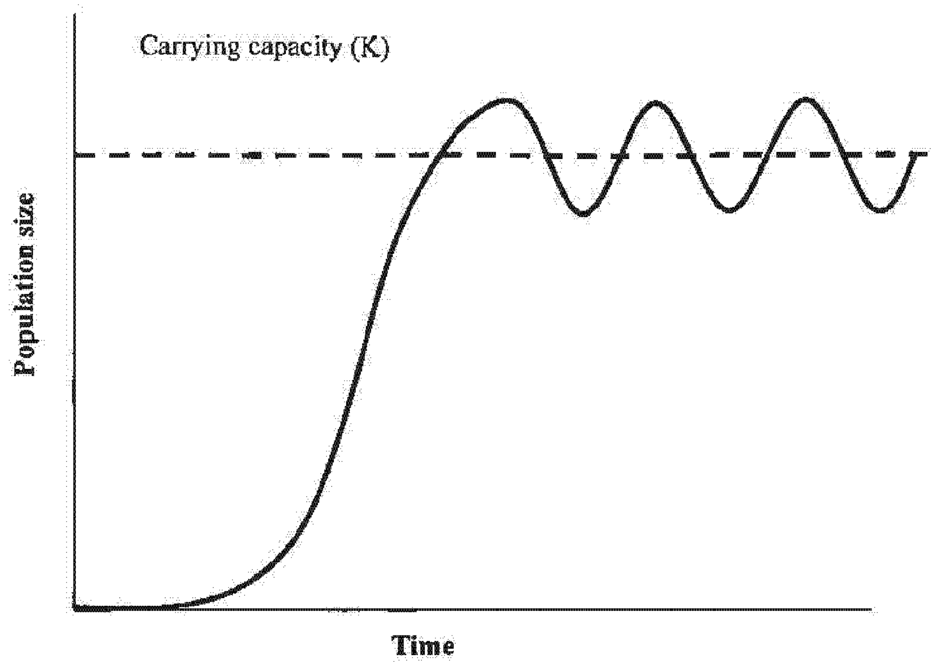

Figure 2. Theoretical population trend with respect to carrying capacity (K). When the population is low, growth rate is rapid. When the population is at or near K, growth rates decelerate and may temporarily decrease as population size fluctuates around K.

Table 2. Derived posterior parameter estimates of annual population density, abundance, and population growth of fishers in the Klamath. Parameters are presented as median [95% credible interval] (Green et al. 2016, p. 15). These estimates have since been reparameterized (Matthews and Green 2020, pers. comm.) but still represent a stable population for this time period.

Year	Density (fishers/100 km2)	Abundance	Lambda
2006	6.64 [4.94, 8.35]	39 [29, 49]	-
2007	6.64 [4.94, 8.18]	39 [29, 48]	1 [0.71, 1.35]

2008	6.99 [5.62, 8.69]	41 [32, 50]	1.06 [0.78, 1.4]
2009	6.47 [5.11, 8.18]	38 [29, 47]	0.92 [0.67, 1.2]
2010	5.79 [4.43, 7.33]	34 [26, 43]	0.91 [0.64, 1.21]
2011	6.47 [5.11, 8.18]	38 [28, 46]	1.09 [0.78, 1.45]
2012	6.3 [4.94, 8.18]	37 [27, 46]	0.98 [0.72, 1.33]
2013	6.99 [5.62, 8.69]	41 [32, 50]	1.11 [0.81, 1.49]

Fishers in the NCSO DPS have rebounded substantially from their low in the late 1800s and early 1900s. Grinnell et al. (1937, p. 227) suggested no more than 300 fishers occurred in all of California. Fishers currently occupy much of their historical range in northwestern California and may have expanded into the redwood region (CDFW 2015, p. 23); fisher detections have increased in northern coastal California since the 1990s, though it is not known as to whether this increase is due to a range expansion, recolonization, increased survey effort, or whether fishers remained undetected in earlier surveys (CDFW 2015, p. 50). Recent monitoring information submitted during the public comment period on the 2019 Revised Proposed Rule indicates fishers continue to occur across much of northern coastal California; systematic camera surveys on private timber lands found fishers at 65 of 93 (70 percent) camera stations (Green Diamond Resource Company [GDRC] 2019, p. 8) during the 2018-2019 winter, suggesting fishers are well-distributed across the company's lands. In Oregon, fishers also appear to have expanded from low numbers in the 1940s, when fishers were considered extremely rare and perhaps close to extirpation (see Barry 2018, pp. 16-17 for summary), to being "relatively common" where the indigenous population is found (Barry 2018, p. 22). Fishers also appear to be widespread and common throughout much of the DPS (CDFW 2015, pp. 54-55).

The major habitat-based threats experienced by the NCSO DPS are loss of complex canopy forests and den/rest sites and fragmentation of habitat from high-severity wildfire, wildfire suppression activities (e.g., backburning, fuel breaks, and snag removal), and vegetation management (e.g., fuels reduction treatments, salvage, hazard tree removal). Major non-habitat related threats are exposure to toxicants and, in some areas, predation. In addition to these threats acting on the NCSO DPS, there are also several conservation efforts designed to benefit fishers. These efforts include those being implemented within the portion of the range covered by the Northwest Forest Plan (NWFP), including measures associated with Endangered Species Act section 7 consultations in overlapping northern spotted owl (*Strix occidentalis caurina*) designated critical habitat. We summarize conservation measures and regulation mechanisms that address some of these threats below in the Existing Regulatory Mechanisms section.

<u>Threats</u>

As described above in the General Threats Information section, we determined our foreseeable future timeframe for evaluating the status of the NCSO fisher based upon the period for which we can reasonably determine that both the future threats and the species' responses to those threats are likely. In general, we considered that the trajectories of the threats acting on fisher subpopulations across the DPS's range could be reliably predicted for 35–40 years into the future.

We estimated this timeframe as a result of our evaluation of an array of time periods used in modeling. For example, climate models for areas with fisher habitat, habitat conservation plans (HCPs), and timber harvest models generally predict 50 to 100 years into the future, and forest planning documents often predict over shorter timeframes (10 to 20 years). We considered 40 years at the time of the 2014 Proposed Rule, and given the 5-year time period since, we are modifying the foreseeable future time period to a range of 35–40 years. This is a timeframe that we can reasonably determine that both the future threats and the species' responses to those threats are likely. This time period extends only so far as the predictions into the future are reliable, including a balance of the timeframes of various models with the types of threats anticipated during the 35- to 40-year time period.

Wildfire and Wildfire Suppression

Direct evidence of fisher population response to wildfire is limited. In a monitored fisher population in the Klamath-Siskiyou area, declines in the overall fisher population occurred after wildfires in the study area in 2014 (Green et al. 2019b, entire). This population of fishers has been monitored since 2006 and the population was considered relatively stable, despite 20 percent of the population having been removed for translocation purposes during that time (Green et al. 2019b, p. 4). Fisher numbers in the study area declined 40 percent from 2013, the year prior to the fires. This decrease became apparent the first full year following the fires (2015) and persisted into the following year (Green et al. 2019b, p. 8, Figure 2). While the fate of the fishers affected by the fire is unknown, it is possible that some fishers may have emigrated out of the burned areas (Green *et al.* 2017, pp. 9-10) or may reoccupy areas that burned at lower severities in the future. The decline appears to be within the range of pre-fire estimates, as evidenced by overlapping credible intervals between the post-fire and pre-fire population estimates. The post-fire population data was compared only with abundance data from 2013, and it was not evaluated in context with the overall pre-fire population trend to assess the decline in context with the overall historical population trend; in addition, monitoring data since 2016 is not yet fully evaluated. Both of these tasks are currently underway (Matthews and Green 2020, pers. comm.). Fisher densities declined across all wildfire severity types, but they declined the most in areas with more than a 50 percent loss of tree basal area, consistent with other studies (Green et al. 2019b, pp. 6, 9). The authors note that their data represent only the short-term effects of fires, and any negative effects may not persist. We do not know the fate of individual fishers that left the population after the fire and whether their fitness was ultimately compromised. But this analysis does suggest that high-severity fires can have immediate and substantial effects on local fisher numbers.

Within the Biscuit Fire area in southwest Oregon, which burned in 2002, surveys conducted in 2016 and 2017 did not detect fishers within the burn perimeter (Barry 2018, pp. 22–23), suggesting the fires have extirpated fishers from the burn area. Detection records do not suggest fisher was ever abundant in the area prior to the fire (Service 2016, pp. 24, 33, 34, and 35, Figures 4, 6, 7, and 8), however much of the Kalmiopsis Wilderness Area, which is within the burn perimeter, does not appear to have been surveyed, likely due to limited access.

Given projected changes in climate, forests are expected to become more vulnerable to wildfires over the coming century. For example, the proportion of forests considered highly suitable for wildfire in the Klamath Mountains is projected to increase from 18 percent to 48–51 percent by the end of the century, with most of that increase projected to occur on Federal lands

(Davis et al. 2017, p. 180). Fire return intervals in low to mid elevation forests in Northwest California and the Sierra Nevada Mountains have among the highest departure rates from historical fire return intervals in the State (Safford and Van de Water 2014, pp. iii, 17, 22, 36-37). And, fire return intervals in the Coast Range and Klamath mountains in Oregon are expected to decrease by half, which would result in a near tripling of the annual area burned in this century compared to last (Sheehan et al. 2015, pp. 20–22; Dalton et al. 2017, p. 46). We note that the projected increases include fires of all severity types, so the potential wildfire areas do not translate directly to an amount of fisher habitat removed. In the case of low- and moderate-severity fires, these may actually create elements used by fishers.

An analysis of fire effects on fisher habitat was done centering on the Klamath Basin and encompassing the NCSO (CBI, 2019b and 2019c, entire). The study looked at fisher habitat patches large enough to support five or more breeding female home ranges (CBI 2019b, p. 16) and labeled them as core habitat; the study also identified fisher linkage areas, which were areas on the landscape identified as least-cost pathways to connect the core habitats (CBI 2019b, pp. 3, 16). They found that 24 percent of modeled fisher core areas, and 24 percent of modeled fisher linkage areas were considered at risk of at least temporary loss due to severe fires (CBI, 2019c, pp. 22, 25). It is important to note that this does not total to 48 percent of the fisher habitat in the study area; core areas are larger patches of fisher habitat, while linkage areas may or may not comprise suitable habitat, but instead represent "least cost" paths between core areas.

To update our 2014 analysis of wildfire effects within the NCSO DPS, we conducted an analysis similar to the one completed for the 2014 draft Species Report (Service 2014, pp. 62–64; Service 2019b, unpublished data). Using the fisher habitat map developed for the 2014

Proposed Rule (Service 2016, Appendix B) and USFS data for burn severity for 2008–2018 (USFS 2019), we estimated the effects of high-severity wildfire to fisher habitat (high and intermediate categories) over the past 11 years. We assumed wildfires that burned at high severity (greater than 50 percent basal area loss) changed fisher habitat to a condition that would not be selected by fishers for denning and resting (although this may not always be the case, as described above in the General Species Information section). Use of >50 percent basal area loss is consistent with recent fire effects analyses on fishers based on the recent results as reported in Green *et al.* (2019b, p. 6). Overall, high and intermediate quality fisher habitat in the NCSO DPS decreased by 526,424 ac (213,036 ha) from 7,050,035 ac (2,853,047 ha) to 6,523,610 ac (2,640,011 ha), or approximately 7.5 percent was lost as a result of wildfires since 2008; this is an average loss of 6.8 percent per decade.

For comparison purposes, in our 2014 draft Species Report, we estimated 4 percent of fisher habitat would be lost over the next 40 years due to high-severity wildfire, or 1 percent per decade (Service 2014, p. 64). Our 2014 area of analysis for the NCSO subpopulation was based on 27 years of fire data from 1984 to 2011 and assessed approximately 24,080,693 ac (9,745,111 ha), compared to the 10,459,612 ac (4,232,855 ha) assessed in our recent analysis above. The results of our new analysis is based on fire data from the period 2008 to 2018, an 11-year period of the most recent fire activity, which suggests our earlier estimates of changes to fisher habitat from wildfire over the next 40 years may have been an underestimate. However, while this increase in area burned may be consistent with the projections for wildfire increases in the DPS, the magnitude of increase in burned fisher habitat (i.e., from 1 percent per decade in our 2014 analysis to 6.8 percent in our 2019 analysis) may not be a true reflection of the rate of change between the two time periods because of the different temporal (28 years vs 11 years) and geographic (the area analyzed in 2014 was twice as large as the area assessed in 2019) scales used in the comparison. Nevertheless, we recognize the increase in fire activity within the NCSO.

The geography of the Klamath ecoregion, which makes up much of the NCSO where fishers occur, is steep and complex. The variation in elevation and aspect shapes vegetation composition and distribution. This influences fuels and ultimately fire behavior and location (Taylor and Skinner 1998, p. 297; Taylor and Skinner 2003, p. 714; Skinner et al. xxx p. 179-180). Consequently, fires tend to be more prevalent on drier sites, while less frequent on moister sites, which tends to be areas more consistent with fisher habitat. While these patterns may or may not continue with the effects of climate change, we can use management such as the recent fuels reduction MOUs (see Existing Regulatory Mechanisms below) to leverage existing topography and vegetation condition to better manage for wildfires.

We acknowledge that large scale wildfires affect fisher habitat, particularly given the predicted increases in wildfire associated with climate change by the end of the century. We also acknowledge that fires, even large fires, are part of the natural fire regime within the NCSO DPS, and fishers have sustained themselves and coexisted with wildfire for centuries. Into the future, it will be important to have areas that can maintain reproducing fishers while severely burned areas can regenerate into fisher habitat again, whether that is foraging habitat within a decade or two, or denning and roosting habitat several decades beyond. Existing land allocations like late-successional reserves from the NWFP on Federal lands throughout much of the NCSO DPS, especially in the areas with the greatest fire severities, will be necessary to manage these areas to return to forest habitat with complex structure. This will ensure suitable habitat lost to fires will be managed to develop the overstory and structural features conducive to fishers. In the interim, retaining important structural features in burned areas, per reserve land allocation standards and guidelines, will facilitate the use of these areas by prey and foraging fishers within a few decades following high severity fires.

Although fire risk is expected to increase with climate change, fishers are well distributed across the NCSO DPS, including coastal areas such as the redwood region, which may be less prone to wildfire risk. The redundancy exhibited by the NCSO DPS, with multiple subpopulations distributed across a substantial range of habitat (see Resiliency, Redundancy, and Representation section), will allow for fishers to recolonize into habitat remaining after individual fires, demonstrating the DPS's ability to withstand catastrophic events.

Climate Change

The general climate change related effects discussed above (see General Threats Information) apply to the NCSO DPS, in addition to the following effects, which are more specific to the NCSO DPS. In particular, Siskiyou and Trinity Counties in interior northern California are projected to see the greatest temperature increases for the North Coast Region (Grantham 2018, p. 17). In the Klamath Mountains, models suggest precipitation is likely to fall increasingly as rain rather than snow, becoming mainly rain-dominated by mid-century (Dalton et al. 2017, p. 17). Significant or amplified wildfire activity, with increased area burned and severity can result in reduced denning habitat availability for fishers in the Coast Range and Klamath Mountains. These two areas are projected to experience wildfire return intervals decreased by half and thus result in a near tripling of the annual area burned in this century compared to last (Sheehan et al. 2015, pp. 20–22; Dalton et al. 2017, p. 46). Fire return intervals in low to mid elevation forests in Northwest California and the Sierra Nevada Mountains have among the highest departure rates from historical fire return intervals in the State (Safford and Van de Water 2014, pp. iii, 17, 22, 36-37).

Overall, the best available scientific and commercial information suggests that changing climate conditions (particularly warmer and drier conditions) are influencing other threats to fishers and their habitat within the NCSO DPS, in particular the potential for increased wildfire frequency and intensity. However, this is not to say that the DPS will experience widespread or a uniform distribution of climate-driven wildfire events. Even under conditions for a potential increase in wildfire frequency, wildfires will remain sporadic and episodic across the range of the DPS, further moderated by the slope and aspect of terrain throughout the range (e.g., influencing susceptibility to wildfire, and creating a mosaic of fire severity). The DPS's wide variety of topography, vegetation, and climate conditions in its array of physiographic provinces (Service 2016, pp. 15-17, 28-29, 38-39) results in unpredictable variability in how these provinces will respond to changing climate conditions. Please see additional discussion about potential impacts to fishers or their habitat associated with wildfire (Wildfire and Wildfire Suppression above).

Tree Mortality from Drought, Disease, and Insect Infestation

Specific to the NCSO DPS, sudden oak death (*Phytophthora ramorum*) has caused some tree mortality in southwestern Oregon and northwestern California , but it is not causing widespread losses of oaks (COMTF 2019, p. 1; Oregon Department of Forestry (ODF) 2016, pp. 1–2). This suggests widespread loss of oaks used by fisher or fisher prey is not occurring as a result of sudden oak death. Overall, warmer and drier climate conditions are projected for the NCSO DPS; however, the varied composition of the vegetation (e.g., Lofroth *et al.* 2011, pp. 34–90) in the DPS suggests insect outbreaks and disease due to drought related stress on trees are more likely to be localized should they occur; therefore, future widespread tree mortality impacts to fisher habitat are not anticipated in the NCSO DPS.

Vegetation Management

Although local analyses across the NCSO DPS have assessed fisher habitat at several scales (see Lofroth et al. 2011, pp. 34–90 for study summaries, and Raley et al. 2012, pp. 234–235 for list of additional studies), there is no analysis available that explicitly tracks changes in fisher habitat in recent decades across large portions of the DPS, and which includes fisher habitat ingrowth as well as habitat loss to specific disturbances. Therefore, we used other available information, as described below, to analyze the potential effects of this threat on fishers in the NCSO DPS. In addition to the draft Species Report (Service 2014, pp. 85–96), we used several different sources of information to depict forest vegetation changes caused by vegetation management activities and offset by ingrowth within the range of the NCSO DPS. With the exception of the non-Federal timber harvest database in California (California Department of Forestry and Fire Protections (CAL FIRE) 2013), all of these sources are either new or updated since 2014 (Davis et al. 2015, entire; USFS 2016, entire; Spencer et al. 2016, entire; Spencer et al. 2017, entire; gradient nearest neighbor (GNN) data/maps). With these available data, we did not need to rely on northern spotted owl habitat data as a surrogate for fisher habitat data in this evaluation. Our revised methodology is described in detail for the historical, three-State range of the DPS in the 2016 final Species Report (Service 2016, pp. 98–111); we summarize it below and describe how it applies to the NCSO DPS.

Within the portion of the NCSO DPS overlying the Northwest Forest Plan region (generally most of the NCSO DPS except for the northern Sierras), we used information from the draft late-successional and old-growth forest monitoring report (Davis *et al.* 2015, entire) to assess changes in structural habitat elements associated with fisher habitat (i.e., large trees, down wood, snags) as a result of vegetation management. This information included use of the "old growth structure index" (OGSI), which is an index that consists of four structural elements associated with older forests: (1) the density of large live trees; (2) the density of large snags; (3) the amount of down wood cover; and (4) the tree size diversity of the stand. Over a 20-year period (1993–2012), Davis *et al.* (2015, pp. 5–6, 16–18) tracked changes in forests classed as OGSI–80, which represents forests that begin to show stand structures associated with older forests (e.g., large live trees, snags, down wood, and diverse tree sizes). Though OGSI–80 forests are not a comprehensive representation of fisher habitat, the condition does track forests that contain structural elements consistently used by fishers in habitat studies across the DPS, even in areas with substantially open areas and managed young stands (Lofroth *et al.* 2010, pp. 81–121; Service 2016, pp. 15–21; Niblett *et al.* 2017, pp. 16–17; Powell *et al.* 2019, pp. 21–23; Matthews et al. 2019, p. 1,309, 1,313; Moriarty et al. 2019, pp. 29–30, 46–49). We acknowledge there is some unknown level of overrepresentation of stands that may not be occupied by fishers and underrepresentation of stands that fishers may actually occupy (Service 2016, p. 102), and we do not suggest that OGSI-80 is a surrogate for fisher habitat proper. Hence, we do not consider it a model of fisher habitat.

However, OGSI-80 does cover a majority of the NCSO DPS and provides a way to assess regional-scale trends in forests that contain the structural elements consistently used by fishers (e.g., large snags, down wood, and large live trees). This information was the only data set available that identified the number of acres lost to timber harvest or vegetation management (as well as disturbances from fire and insects) and the number recruited by forest ingrowth. This OGSI-80 data set allows us to track changes as a result of vegetation management and forest recruitment. In using the OGSI-80 data, we do not expect there to be substantial differences in relative trends for disturbances and ingrowth effects on OGSI-80 stands compared to trends in their effects on fisher habitat.

Details of our analysis of Davis et al. (2015, entire) are explained in the 2016 final Species Report (Service 2016, pp. 101–102). We have since modified that analysis to include only data for the areas (physiographic provinces) that cover the current range of fishers in the NCSO DPS. The California portion of the NCSO DPS covers all of the California physiographic provinces analyzed in Davis et al. (2015, pp. 10, 30–31). The Oregon portion of the NCSO DPS occurs mostly within the Oregon Klamath province, but overlaps somewhat into small portions of the western and eastern Cascades provinces (Davis et al. 2015, pp. 10, 30–31). We assessed the results of including and excluding the data from these two Cascades provinces. Because no substantial differences were revealed between the two data sets, we report here the results of including only the Oregon Klamath province data along with data for all of the California physiographic provinces that are covered by the NWFP.

Although loss of OGSI-80 forests due to timber harvest on non-Federal lands (11.1 percent since 1993) was substantially greater than on Federal lands (1.0 percent since 1993), in combining all ownerships, the percent loss due to timber harvest from 1993 to 2012 was low (5.0 percent). This translates to a 2.5 percent loss per decade. However, this may underestimate future harvest trends because timber harvest volume within the NWFP area on Federal lands has been on a general upward trend since 2000. During the first decade of NWFP implementation, Federal agencies offered, on average annually, 54 percent of the timber harvest sale goals (probable sale quantity or PSQ) identified in the Plan, whereas volume offered in 2012 was at about 80 percent of the PSQ identified in the NWFP, as agencies became more familiar with implementing the NWFP (USDI BLM 2015, p. 340; Spies et al. 2018, pp. 8–9). In addition, BLM has recently revised their management plans in western Oregon and is no longer operating under the NWFP. Consequently, that agency is predicting an increase in timber volume above the NWFP sale quantity in the first decade of implementation (through circa 2025) (USDI BLM 2015, pp. 350–352). Recent litigation may also increase timber harvest on BLM (see Existing Regulatory Mechanisms section). Hence, overall harvest trends on Federal lands may be increasing and may be closer to or more than rates observed in the last decade of NWFP implementation (2003 to 2012).

The net loss of OGSI-80 conditions to timber harvest, however, is somewhat less because 2.5 percent per decade does not include ingrowth of OGSI–80 stands. Ingrowth represents those stands that did not meet the OGSI–80 structural thresholds at the beginning of the 20-year monitoring period but, through vegetation succession, reached those thresholds at the end of the monitoring period. Stands that grow into the OGSI-80 condition are assumed to offset the loss of other OGSI-80 to disturbance such as vegetation management. However, we acknowledge that OGSI-80 stands exist on a continuum, and OGSI-80 stands lost to timber harvest or some other disturbance are not necessarily equivalent in structural quality to stands that recently cross a threshold of being classified as OGSI-80. That is, the longer stands remain in the OGSI-80 classification, the more likely they are to contain more old-forest structural conditions that benefit fishers.

Ingrowth of OGSI–80 stands within the NWFP portion of the DPS occurred at a rate of 8 percent over the 20-year period, or 4 percent per decade (calculated from Davis et al. (2015, tables 6 and 7, pp. 30–31)). This ingrowth more than offsets the OGSI–80 stands lost to vegetation management. However, there is still an overall net loss of OGSI-80 stands in the DPS because all disturbances (i.e. wildfire and forest insects and pathogens) need to be considered. When all disturbances and ingrowth are factored in, there is a net loss of 1 percent per decade. However, vegetation management affects a small portion of those habitat components used by fisher within the NWFP area. Furthermore, ingrowth rates are expected to increase in the foreseeable future on Federal lands within the NWFP area because forests regenerating from the post-World War II harvest boom starting in the 1940s are beginning to meet the OGSI–80 threshold (Davis et al. 2015, p. 7).

We note that we incorporated the loss of OGSI-80 stands to wildfire into this analysis of vegetation management only to fully consider the degree to which ingrowth can offset loss of OGSI-80 stands to disturbance. We use a different metric to address the loss of fisher habitat to wildfire (see the Wildfire and Wildfire Suppression section). For the wildfire analysis, we were able to obtain data from past wildfires and overlay it on fisher habitat to better represent fisher habitat loss to high-severity wildfires as well as to incorporate the effects from more recent wildfires than those analyzed by Davis et al. (2015, p. 29).

Outside of the NWFP portion of the DPS (primarily Sierra Nevada region), while we could track vegetation changes over time, the available data did not indicate the amount or types of disturbances affecting the specific vegetation types; that is, we could determine net change in a particular vegetation type, but could not quantify the amount lost to a specific disturbance type, unlike in the NWFP area. Timber harvest records were available for the Sierra Nevada region, but idiosyncrasies in the FACTS (Forest Service Activity Tracking System) database (see Spencer et al. (2016, p. A–30)) and the fact that the available private lands database (CAL FIRE timber harvest plans) did not indicate types of treatment or what portion of the plans may have actually been implemented, led to concerns in translating acres of "treatment" as depicted in these databases into on-the-ground changes in forest vegetation types that could represent fisher habitat. Instead, we relied on net vegetation change data to display actual changes in forests that approximate conditions suitable for fisher habitat, although we realize that net changes include other disturbances and that vegetation management will be some unknown portion of that change.

For the Sierra Nevada Range (note that this includes the entire range, as we were not able to split out the SSN DPS from the NCSO DPS), we approximated fisher habitat change using a vegetation trend analysis to track changes in forests with large structural conditions thought to be associated with fisher habitat (see Service 2016, p. 106 for a description related to using gradient nearest neighbor (GNN) data). The vegetation category tracked in this analysis is not equivalent to the OGSI–80 forests used by Davis et al. (2015, entire). Instead, the available data limited us to using predefined structure conditions describing forests with larger trees (greater than 20 in (50 cm)). We realize this may not include all vegetation types used by fishers. This analysis showed that net loss of forests with larger structural conditions in the Sierra Nevada Range was 6.2 percent across all ownerships over the past 20 years, which equates to a loss of 3.1 percent per decade. However, this is loss associated with all disturbance types, including wildfire and insects and disease, that occurred from 1993 through 2012. Hence, vegetation management is some unknown subset of this loss.

Vegetation management is not affecting large areas of the NCSO DPS, though fragmentation could be restricting fisher movements in localized areas or increasing predation risk. For example, fishers continue to persist in actively managed landscapes (GDRC 2019), and fishers reintroduced into the Sierra Nevada portion of the NCSO DPS on SPI lands, which are managed for timber production, suggest that fisher populations can become established and persist in a landscape where substantial portions were historically and are currently managed for timber production (Powell *et al.* 2019, entire; Green *et al.* 2020, entire). Hence, we conclude that vegetation management is a low level threat because of the small proportion of area harvested in the NCSO DPS and because of the widespread distribution of fishers and their occurrence in actively managed landscapes.

Exposure to Toxicants

As described above in the General Threat Information, rodenticides analyzed as a threat to the NCSO DPS of fishers include first- and second-generation anticoagulant rodenticides and neurotoxicant rodenticides. Both the draft and final Species Reports detail the exposure of the NCSO DPS of fishers to rodenticides in northern California and southern Oregon (Service 2014, pp. 149–166; Service 2016, pp. 141–159). Data available since the completion of the final Species Report in 2016 continue to document exposure and mortalities to fishers from rodenticides in the NCSO DPS (Gabriel and Wengert 2019, unpublished data, entire). Data for 48 fisher carcasses collected in the range of the NCSO DPS in the period 2007–2018 indicate 36 fishers (75 percent) tested positive for one or more rodenticides (Gabriel and Wengert 2019, unpublished data), while 13.5 percent of fisher mortalities with a known-cause in the NCSO DPS from 2007 through 2014 were attributable to rodenticides (7 of 52 mortalities) (Gabriel et al. 2015, p. 6). Mortalities due to rodenticide toxicosis have increased from 5.6 to 18.7 percent since the collection and testing of fisher mortalities began in 2007 (Gabriel and Wengert 2019, unpublished data). From 2015 to 2018, additional NCSO DPS fisher mortalities due to both anticoagulant and neurotoxicant rodenticides have been documented (Gabriel and Wengert 2019, unpublished data, p. 4). At the Hoopa study site, population monitoring found "the population as a whole is essentially stable" (Higley et al. 2014, p. 31), but there are concerns about declines in survival of males over the last 3 years of the study. The authors speculate this decline in male survival is attributed to toxicant poisoning associated with illegal grow sites and that males were identified as being at a higher risk for poisoning because of their larger home ranges compared to females (Higley et al. 2014, pp. 32, 38).

To evaluate the risk to NCSO DPS fishers from illegal grow sites, we use a Maximum Entropy model to identify high and moderate likelihood of illegal grow sites being located within fisher habitat (Gabriel and Wengert 2019, unpublished data, pp. 7–10) in Oregon and California. This model indicates that 54 percent of habitat modeled for NCSO DPS fishers is within areas of high and moderate likelihood for marijuana cultivation.

The majority of our illegal grow site data comes from California and data are limited for the amount of pesticides used in Oregon. The USFS documented 63 trespass grows between

2006 and 2016, with toxicants present at all these sites (Clayton 2019, pers. comm.). In a separate effort, only one illegal grow site in southern Oregon has been sampled using the same protocol as 300 illegal grow sites in California where the amount and type of rodenticide at a site is tracked. This southern Oregon location had 54 pounds (lb) (24.5 kilograms (kg)) of first-generation anticoagulant rodenticide and 8 lb (3.6 kg) of neurotoxicant rodenticide dispersed around the site (Gabriel and Wengert 2019, unpublished data, p. 7).

As of January 24, 2020, 2,138 legal marijuana cultivation permits were active in Counties within the NCSO and SSN DPSs in California (California Department of Food and Agriculture 2020, entire), and 423 legal marijuana operations have been approved as of January 17, 2020, in Oregon Counties occupied by fishers (Oregon Liquor Control Commission 2020, entire).

Toxicant use on the landscape, and especially anticoagulant rodenticides, is a problem for fisher. However, the Stirling subpopulation has grown to the point of becoming self-sustaining (Green et al. 2020, p. 11; Powell et al. 2019, p. 4) in spite of 11 of 12 fishers testing positive for anticoagulant rodenticides (Powell et al. 2019, p. 17). This suggests that toxicants may not be having a limiting effect on population growth in this area. And, at EKSA only small annual variations were seen in the lambda value (Tabe 1) from 2006 to 2013 (Green et al. 2016, p. 15). This is at the same time as toxicant data were being collected, and presumably there were illegal grow sites distributed throughout the landscape. Illegal marijuana cultivation has been occurring in California since the mid 1970s. To some degree, the fisher's widespread distribution and relative commonness in the NCSO DPS diffuses the potential for a significant percentage of the subpopulation to be exposed to these toxicants. The presence of illegal grow sites on the landscape since the mid 1970s suggests that the fisher has been living with this threat for some time.

We do not know what level of toxicant exposure is occurring in live fishers in the wild. The best available mortality data are limited (19 individuals in California (Gabriel and Wengert 2019, unpublished data, p. 5), and of the two fishers found in Oregon that were tested for rodenticide exposure, both tested positive (Clayton 2016, pers. comm.). We also do not know how the legalization of marijuana will change grow-site location and potentially affect exposure and mortality rates of fishers due to rodenticides.

We view toxicants as a potentially significant threat to fishers in the NCSO DPS because of the reported exposure rate of toxicants in the NCSO DPS, the reported mortalities of fishers from toxicants in the NCSO DPS, the variety of potential sublethal effects due to exposure to rodenticides (including potential reduced ability to capture prey and avoid predators), and the degree to which illegal cannabis cultivation overlaps with the range and habitat of fisher in the NCSO DPS. The exposure rate of 75 percent of fisher carcasses tested in the NCSO DPS has not declined between 2007 and 2018 (Gabriel and Wengert 2019, unpublished data, pp. 3–4), while toxicosis has increased since 2007 (Gabriel et al. 2015, p. 7). As noted above, we do not know the exposure rate of live fishers to toxicants because this data is difficult to collect. In addition, the minimum amount of anticoagulant and neurotoxicant rodenticides required for sublethal or lethal poisoning of fishers is currently unknown. In spite of the widespread nature of illegal grow sites and their known association with illegal rodenticide use, as well as the prevalence of toxicants occurring in tested fishers, the NCSO subpopulation may be demonstrating an ability to withstand this threat with regard to population growth (considering increasing and stable trends at Stirling, EKSA, and Hoopa).

Illegally used toxicants like rodenticides remain a threat to fishers within the NCSO DPS now and in the foreseeable future. Where illegal marijuana grow sites occur on the landscape and overlap with fisher ranges, illegally used pesticides have a high potential to harm those exposed individual fishers. However, while the threat of people developing illegal grow sites is widespread, we also note that such sites are generally widely dispersed within remote landscapes across the DPS range (i.e., illegal growers look to be as isolated and hidden as possible). This would suggest that potential for significant exposure to fishers is generally limited to where the grow sites are located. However, while there is no certain discernible trend regarding whether illegal grow sites may increase or decrease as a result of marijuana legalization, it will still likely take many years before the currently existing sites can be found and remediated.

Potential for Effects Associated With Small Population Size

The NCSO DPS, which encompasses both the SOC and NSN reintroduction sites, covers a relatively large geographic area of approximately 15,444 mi^2 (40,000 km^2). Overall, the NCSO DPS has not expanded beyond our previous estimates; however, the SOC subpopulation may have contracted (Barry 2018, p. 22; Moriarty et al. 2019, p. 5) while the NSN subpopulation continues to grow (Powell et al. 2019, p. 2). Please see the Current Condition section above for detailed information on subpopulation size estimates.

Generally, the ability of a species (or DPS) to withstand a catastrophic event (i.e., bounce back from an event that may result in the loss of a population or large proportion of individuals) is lower with relatively few populations or a very limited distribution across the landscape.

Overall, the NCSO DPS has not appeared to grow or expand, despite the availability of suitable habitat. However, multiple, well-distributed subpopulations (i.e., NCSO, NSN, and SOC) continue to exist across the DPS; this includes aggregates of individuals in geographic areas within NCSO (i.e., EKSA fishers, fishers in and around Redwood National Park, Hoopa fishers, or fishers spread downslope of the Siskiyou Crest). At this time, the best available information for monitored fishers within the DPS (e.g., Green 2017, Higley et al. 2014, Powell et al. 2014, entire; Sweitzer et al. 2015a, entire) does not indicate whether the NCSO DPS is increasing, stable, or declining. Tucker et al. (2012, pp. 8, 11) found low genetic diversity within the NCSO population (and SSN population), but the NCSO population (and SSN population) may have had low genetic diversity prior to the late 1800s when historical samples were taken. However, fishers have rebounded from substantial population reductions that resulted from historical trapping and habitat loss, and they are currently widespread and common across the DPS. Fishers are well distributed across the NCSO DPS, without barriers for genetic exchange between and among its subpopulations (e.g., genetically homogeneous fishers occupy either side of the Klamath River adjacent to a 2-lane, paved highway (Service 2016, p. 113). Genetic diversity decreases moving southward with the peripheral areas (e.g. SSN DPS) having the lowest genetic diversity (Wisely *et al.* 2004). Low genetic diversity can result in inbreeding depression, and one way to assess the risk of inbreeding depression is to determine the effective population size. An effective population size is the number of individuals in an ideal population that would result in the same level of inbreeding or genetic drift as that of the population under study (Jamieson and Allendorf 2012, p. 578). It is usually substantially smaller than the actual number of individuals in the population, often 10 to 20 percent of the census (actual) population size

(Frankham 1995, p. 100). An effective population size estimate of 128 individuals for northwestern California suggests inbreeding depression is not a problem (Tucker et al. 2012, pp. 7-8, 10) when compared to thresholds of 50 or 100 individuals from the established literature discussing effective population sizes (Jamieson and Allendorf 2012, entire; Frankham et al. 2014, entire).

As we have described herein and previously, the NCSO DPS is isolated from other fisher populations, and small relative to the taxon as a whole. As such, the risks of small population size effects and of extinction exist. However, the broad distribution of the DPS across its range, in combination with the DPS occurring in multiple subpopulations with no barriers to genetic exchange within and between those subpopulations, and the low likelihood of a catastrophic event at a scale that could hypothetically affect the entire DPS, indicates that the risks of small population size effects and of extinction are very low.

Disease and Predation

A general description of disease and predation on fishers is provided above (see General Species Information and Summary of Threats). Specific to the California portion of the NCSO DPS, of 42 fisher mortalities analyzed, 54 percent were a result of predation and 19 percent were caused by disease (Gabriel et al. 2015, p. 7, Table 2). It is not unexpected that predation is the greatest source of mortality given the suite of larger, generalist predators that occupy the NCSO DPS (e.g., coyotes, bobcats, and mountain lions). As noted in the General Species Information and Summary of Threats section, we do not know whether observed predation rates are substantially different from historical rates, or whether they are comparable with other populations not subjected to trapping. We acknowledge that sublethal effects of toxicants as well as a possible increase in exposure to generalist predators as a result of habitat modification may result in higher predation rates than what historically occurred (Gabriel et al. 2015, p. 14). However, fishers continue to remain widely distributed across the DPS, there is recent evidence of population growth from the Stirling site (NSN subpopulation) , and the EKSA exhibits seemingly normal variability in spite of these stressors.

Vehicle Collisions

Vehicle related mortalities make up a small portion of overall fisher mortality across California (see General Species Information and Summary of Threats above) and particularly in the NCSO DPS (Service 2016, p. 138). Although major paved highways with high-speed traffic occur throughout the DPS, available records do not indicate localized areas of concentrated mortalities that may substantially decrease local fisher populations. Hence, we do not consider vehicle collisions to be a substantial threat to fishers in the NCSO DPS.

Existing Regulatory Mechanisms

Forest Service (USFS) and BLM

A number of Federal agency regulatory mechanisms pertain to management of fisher (and other species and habitat). Most Federal activities must comply with the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 et seq.). NEPA requires Federal agencies to formally document, consider, and publicly disclose the environmental impacts of major Federal actions and management decisions significantly affecting the human environment. NEPA does not regulate or protect fishers, but it requires full evaluation and disclosure of the effects of Federal actions on the environment.

Other Federal regulations affecting fishers are the Multiple-Use Sustained Yield Act of 1960, as amended (16 U.S.C. 528 et seq.), and the National Forest Management Act of 1976, as amended (NFMA) (90 Stat. 2949 et seq.; 16 U.S.C. 1601 et seq.). The NFMA specifies that the USFS must have a land and resource management plan to guide and set standards for all natural resource management activities on each National Forest or National Grassland. Additionally, the fisher has been identified as a sensitive species and a species of conservation concern by the USFS, requiring Forest Plans to include Standards and Guidelines designed to benefit fisher. Overall, per USFS guidelines under the NFMA, planning rules must consider the maintenance of viable populations of species of conservation concern.

BLM management is directed by the Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1704 et seq.). This legislation provides direction for resource planning and establishes that BLM lands shall be managed under the principles of multiple use and sustained yield. This law directs development and implementation of resource management plans, which guide management of BLM lands at the local level. Fishers are also designated as a sensitive species on BLM lands.

In addition, the NWFP was adopted by the USFS and BLM in 1994 to guide the management of more than 24 million ac (9.7 million ha) of Federal lands within the range of the northern spotted owl, which overlaps with portions of the NCSO DPS of fisher in Oregon and northwestern California (U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI) 1994, entire). The NWFP Record of Decision amended the management plans of National Forests and BLM districts and provided the basis for conservation of the northern spotted owl and other late-successional and old-growth forest associated species on Federal lands. However, in 2016 the BLM revised their Resource Management Plan (RMP), replacing NWFP direction for BLM-administered lands in western Oregon, totaling approximately 2.5 million ac (1 million ha) (USDI BLM 2016a, 2016b, entire). This RMP affects BLM lands, which are mostly in the interior portion of the NCSO DPS in Oregon and portions of the SOC subpopulation.

Compared with management under the NWFP, BLM's revised RMP results in a decrease in land allocated for timber harvest, from 28 percent of their planning area in the Matrix allocation under NWFP to 20 percent under their revised RMP. However, volume of timber harvest is expected to increase to 278 million board feet per year through the first decade, up from the highest NWFP annual amount of about 250 million board feet, and the average NWFP annual amount of 167 (USDI BLM 2015, pp. 350–352). Forest stand conditions assumed to represent fisher habitat are expected to decline in the first two decades under the revised RMP, similar to projections under the NWFP. However, by decade three, habitat is projected to increase under the revised plan compared to the NWFP because more fisher habitat is in reserve allocations under the revised plan (75 percent of fisher habitat on BLM land) than under the NWFP (49 percent) (USDI BLM 2015, pp. 1,704–1,709). We acknowledge that a court recently found that the revised RMP violated statutes regulating timber harvest by setting aside timberland in reserves where the land is not managed for permanent forest production and the timber is not sold, cut and removed in conformity with the principle of sustained yield; the decision has been appealed, and thus the ultimate outcome is as yet unknown. (*American Forest Resources Council, et al., v. Hammond, et al.,* 2019 WL 6311896 (D.D.C. 11/22/2019)(appeal pending, *American Forest Resources Council, et al. v. United States, et al.*, (D.C. Cir., appeal filed 1/24/2020)). Hence, we use the existing RMP in our analysis of regulatory mechanisms.

Federal lands are important for fishers because they have a network of late-successional and old-growth forests (LSRs) that currently provide habitat for fisher, and the amounts of fisher habitat are expected to increase over time. Also, the National Forest and BLM units with watersheds inhabited by anadromous fish provide buffers for riparian reserves on either side of a stream, depending on the stream type and size. With limited exceptions, timber harvesting is not permitted in riparian reserves, and the additional protection guidelines provided by National Forests and BLM for these areas may provide refugia and connectivity between blocks of fisher habitat. Also, under the NWFP, the USFS, while anticipating losses of late-successional and old-growth forests in the initial decades of plan implementation, projected that recruitment would exceed those losses within 50 to 100 years of the 1994 NWFP implementation (Davis et al. 2015, p. 7). Furthermore, BLM, under its revised management plans, is also projecting an increase in forest stand conditions that are assumed to represent fisher habitat above current conditions beginning in the third decade of plan implementation (USDI BLM 2015, p. 875).

National Park Service

Statutory direction for the National Park Service lands within the NCSO DPS is provided by the provisions of the National Park Service Organic Act of 1916, as amended (54 U.S.C. 100101). Land management plans for the National Parks within Oregon and California do not contain specific measures to protect fishers, but areas not developed specifically for recreation and camping are managed toward natural processes and species composition and are expected to maintain fisher habitat where it is present.

Tribal Lands

Several tribes within the NCSO DPS recognize fishers as a culturally significant species, but only a few tribes have fisher-specific guidelines in their forest management plans. Some tribes, while not managing their lands for fishers explicitly, manage for forest conditions conducive to fisher (for example, marbled murrelet (*Brachyramphus marmoratus*) habitat, old-forest structure restoration). Trapping is typically allowed on most reservations and tribal lands, but it is typically restricted to tribal members. Whereas a few tribal governments trap under existing State trapping laws, most have enacted trapping laws under their respective tribal codes. However, trapping (in general) is not known to be a common occurrence on any of the tribal lands.

Rodenticide Regulatory Mechanisms

The threats posed to fishers from the use of rodenticides are described under "Exposure to Toxicants," above. In the 2016 final Species Report (Service 2016, pp. 187–189), we analyzed whether existing regulatory mechanisms are able to address the potential threats to fishers posed from both legal and illegal use of rodenticides. As described in the 2016 final Species Report, the use of rodenticides is regulated by several Federal and State mechanisms (e.g., Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended, (FIFRA) 7 U.S.C. 136, et seq.; California Final Regulation Designating Brodifacoum, Bromadiolone, Difenacoum, and Difethialone (Second Generation Anticoagulant Rodenticide Products) as Restricted Materials, California Department of Pesticide Regulation, 2014). The primary regulatory issue for fishers with respect to rodenticides is the availability of large quantities of rodenticides that can be purchased under the guise of legal uses, but are then used illegally at marijuana grow sites within fisher habitat. Both the Environmental Protection Agency (EPA) and California's Department of Pesticide Regulation developed an effort to reduce the risk posed by the availability of second-generation anticoagulants to end-users, through the 2008 Risk Mitigation Decision for Ten Rodenticides (EPA 2008, entire). This effort issued new legal requirements for the labeling, packaging, and sale of second-generation anticoagulants, and through a rule effective in July 2014, restricted access to second-generation anticoagulants (California Food and Agricultural Code Section 12978.7).

State Regulatory Mechanisms

Oregon

The fisher is a protected wildlife species in Oregon, meaning it is illegal to kill or possess fishers (Oregon Administrative Rule (OAR) 635–044–0430). In addition, Oregon Department of Fish and Wildlife (ODFW) does not allow trapping of fishers in Oregon. Although fishers can be injured and/or killed by traps set for other species, known fisher captures are infrequent (Service 2016, p. 126). State parks in Oregon are managed by the Oregon Parks and Recreation Department, and many State parks in Oregon provide forested habitats suitable for fishers.

The Oregon Forest Practice Administrative Rules (OAR chapter 629, division 600) and Forest Practices Act (Oregon Revised Statutes (ORS) 527.610 to 527.770, 527.990(1) and 527.992) (ODF 2018, entire) apply to all non-Federal and non-tribal lands in Oregon, regulating activities that are part of the commercial growing and harvesting of trees, including timber harvesting, road construction and maintenance, slash treatment, reforestation, and pesticide and fertilizer use. The OAR provides additional guidelines intended for conserving soils, water, fish and wildlife habitat, and specific wildlife species while engaging in tree growing and harvesting activities, and these rules may result in retention of some structural features (i.e., snags, green trees, downed wood) that contribute to fisher habitat.

Management of State forest lands is guided by forest management plans. Managing for the structural habitats as described in existing plans should increase habitat for fishers on State forests. However, we acknowledge that the Oregon Department of Forestry recently lost a lawsuit on its State Forest Management Plans that could result in increased timber harvest and reduced retention or development of forest area suitable for fishers, but the ultimate remedy is still unknown. Hence, we must use the existing plans in our analysis of regulatory mechanisms.

California

On June 10, 2015, CDFW submitted its status review of the fisher to the California Fish and Game Commission (CFGC), indicating that listing of the fisher in the Southern Sierra Nevada Evolutionarily Significant Unit (ESU) as threatened was warranted, but that fishers in the Northern California ESU (similar to the California portion of the NCSO DPS) were not threatened (CDFW 2015, entire). CFGC made their final determination to list the Southern Sierra Nevada ESU as threatened and that listing the Northern California ESU was not warranted on April 20, 2016 (CFGC 2016, p. 10). The determinations were made after concluding that the cumulative effects of threats would not threaten the continued existence of fishers due to the size and widespread distribution of the fisher population in the ESU (CDFW 2015, p. 141; CFGC 2016, pp. 7-10). It remains illegal to intentionally trap fishers in all of California (Cal. Code Regs. title 14, §460 2017). Data on incidental captures of fishers in traps set for other furbearer species is not available, but the requirement to use non-body-gripping traps suggests that most trapped fishers could be released unharmed (Service 2016, p. 126).

The California Environmental Quality Act (CEQA) can provide protections for a species that meets one of several criteria for rarity (CEQA 15380). Fishers throughout the NCSO DPS's range in California meet these criteria, and under CEQA, a lead agency can require that adverse impacts be avoided, minimized, or mitigated for projects subject to CEQA review that may impact fisher habitat. All non-Federal forests in California are governed by the State's Forest Practice Rules (FPR) under the Z'Berg Nejedly Forest Practice Act of 1973, a set of regulations and policies designed to maintain the economic viability of the State's forest products industry while preventing environmental degradation. The FPRs do not contain rules specific to fishers, but they may provide some protection of fisher habitat as a result of timber harvest restrictions.

Voluntary Conservation Mechanisms

An intergovernmental MOU for fisher conservation was signed by Federal and State agencies in Oregon (DOI et al. 2016, entire) to facilitate and coordinate fisher conservation activities among the parties. Multiple interagency MOUs are also in place in California with the intention to coordinate and collaborate on actions that may reduce wildfire risk across multiple ownerships; actions that reduce wildfire may also provide reduce risk to habitat loss for multiple species including the fisher. Since the publication of the 2019 Revised Proposed Rule, an interagency MOU (titled "Forest Fuels Reduction and Species Conservation in California") was signed on February 7, 2020, by the USFS, the State, SPI, and the National Fish and Wildlife Foundation to facilitate coordinated actions that may contribute to fuels reduction efforts and species conservation across the various land ownerships (USFS *et al.* 2020a). Fisher-specific conservation measures are included in this MOU, in addition to conservation measures for the California and northern spotted owls. The measures promote fisher occupancy and habitat through increased resilience and resistance of habitat from multiple disturbances, including uncharacteristic wildfire. More specifically, participants will implement activities consistent with the conservation needs of the fisher including retention of known natal dens, retention or recruitment of hardwoods and structurally diverse forests, retention of shrubs and smaller trees in areas with sparse overstory cover, and avoid poisoning potential prey species.

There are additional MOUs in California within the range of the NCSO DPS for wildfire and fuels management, but with no specific conservation measures for fisher. An MOU was signed in 2015 by multiple conservation groups, California Department of Forestry and Fire Protection, two Federal agencies, and two prescribed fire councils (USFS 2015). The MOU is titled "Cooperating for the purpose of increasing the use of fire to meet ecological and other management objectives." The purpose of this MOU is to document the cooperation between the parties to increase the use of fire to meet ecological and other management objectives. Finally, a challenge cost share agreement was signed in 2017 by the National Fish and Wildlife Foundation, and the USFS, Pacific Southwest Region, Regional Office (USFS 2017). The agreement is titled "Pacific Southwest Fuels Management Strategic Investment Partnership." The purpose of this agreement is to document the cooperation between the parties to implement a hazardous fuels management program that reduces the risk of severe wildfire, protects ecological values, and reduces the change of damage to public and private improvements.

All of these MOUs and the cost share agreement provide collaboration between federal partners and non-governmental organizations to coordinate and fund fuel reduction projects within the NCSO DPS, which could reduce the impact of large-scale high severity fire. So far, we are aware of two fuel reduction projects that have been funded as part of the MOUs within the NCSO DPS, one on the Lassen National Forest and one on the Six Rivers National Forest.

A template CCAA for fishers in western Oregon (81 FR 15737, March 24, 2016) has been published, and we have negotiated site plans and issued permits to five private timber entities (with three more site plans under review), as well as Oregon Department of Forestry (84 FR 4851, February 19, 2019; 84 FR 31903, July 3, 2019). Conservation actions in the CCAA include protection of occupied den sites as well as landowner participation and collaboration with fisher surveys and research as part of a defined program of work. To date, permittees have committed $200,000 in cash or in-kind support towards this program of work as part of meeting conservation measures within the CCAA.

In 2009, a programmatic Safe Harbor Agreement (SHA) was completed for northern spotted owls in Oregon (74 FR 74 35883, July 21, 2009). The agreement authorizes the ODF to extend incidental take coverage with assurances through issuance of Certificates of Inclusion to eligible, non-Federal landowners who are willing to carry out habitat management measures benefitting the northern spotted owl. The purpose of the agreement is to encourage non-Federal landowners to create, maintain, and enhance spotted owl habitat through forest management, which would also benefit fishers given the two species' use of similar habitat components.

For the portion of the NCSO DPS in California, reintroduction efforts have resulted in establishment of a fisher subpopulation in the SPI Stirling Management Area within the NSN with the potential to connect with fishers in the remainder of the NCSO DPS to the north. In 2016, an approximately 1.6 million-ac (647 thousand-ha) CCAA for fishers on lands in Sierra

Pacific Industries (SPI) ownership in the Klamath, Cascade, and Sierra Nevada mountains was completed (SPI and Service 2016, entire). This CCAA encompasses approximately 5 percent of potentially suitable fisher habitat in the California portion of the NCSO DPS, 2.7 percent of which is currently occupied. Implementation and monitoring have been under way since that time. The objectives of this CCAA are to secure general forested habitat conditions for fishers for a 10-year time period (2016 to 2026) and the retention of important fisher habitat components (large trees, hardwoods, and snags) suitable for denning and resting into the future. Although this CCAA expires in six years, SPI has a track record of partnering with the Service and has demonstrated a commitment to fisher conservation through the development of this CCAA. We anticipate at the end of the CCAA SPI will continue to conserve fisher. This conservation could be embodied in a new or renewed CCAA, or fisher conservation could be added to an HCP that is currently in development for northern and California spotted owls.

In 2019, the Service finalized an incidental take permit for the Green Diamond Forest Resource Company HCP (GDRC 2018, entire), which is anticipated to provide a conservation benefit for fishers and their habitat in Del Norte and Humboldt Counties, California (portions of forests on the west slope of the coastal and Klamath Mountains). Conservation benefits anticipated by GDRC include (but are not limited to): identifying and retaining fisher denning and resting trees, including maintaining a 0.25 mi (0.4 km) radius no-harvest buffer around active fisher dens; fisher-proofing water tanks and pipes; implementing measures that detect, discourage, and remove unauthorized marijuana cultivation and associated pesticide use; and cooperating with any Federal or State-approved fisher capture and relocation/reintroduction recovery programs (Service 2019a, p. 2).

In 1999, the Service finalized an incidental take permit for the Pacific Lumber Company (now Humboldt Redwood Company) HCP (Pacific Lumber Company *et al.* 1999, entire), which provides a conservation benefit for fishers and their habitat in Humboldt County, California). Conservation benefits include, but are not limited to: 1) retention of late seral habitats that provide denning and resting habitat for fishers, 2) channel migrations zones and riparian management zones to provide connectivity across the landscape, and 3) retention and recruitment of suitable habitat structural elements that provide late seral habitat features for fishers f when cut stands reach mid-succession.

Resiliency, Redundancy, and Representation

In this section, we use the conservation biology principles of resiliency, redundancy, and representation to evaluate how the threats, regulatory mechanisms, and conservation measures identified above relate to the current and future condition of the NCSO DPS.

Resiliency is defined as the ability of populations to withstand stochastic events (events arising from random factors). Measured by the size and growth rate of populations, resiliency gauges the probability that the populations comprising a species (or DPS) are able to withstand or bounce back from environmental or demographic stochastic events.

Redundancy is defined as the ability of a species (or DPS) to withstand catastrophic events, and may be characterized by the degree of distribution of the species, either as individuals of a single population or as multiple populations, within the species' ecological settings and across the species' range. The greater redundancy a species exhibits, the greater the chance that the loss of a single population (or a portion of a single population) will have little or no lasting effect on the structure and functioning of the species as a whole.

Representation is defined as the ability of a species (or DPS) to adapt to changing environmental conditions. Measured by the breadth of genetic or environmental diversity within and among populations, representation gauges the probability that a species is capable of adapting to environmental changes.

As noted above, the resiliency of species' population(s), and hence an assessment of the species' overall resiliency, can be evaluated by population size and growth rate. While data on these parameters are often not readily available, inferences about resiliency may be drawn from other demographic measures. In the case of the NCSO DPS, the population size component of resiliency for the overall DPS may be lower than historical levels to some degree, based simply on historical losses. However, we also know that fishers in the DPS have rebounded from the lows of the early-and mid-1900s, and continue to remain widely distributed and common across the DPS. Furthermore, forest carnivores generally occur at low densities (Ruggiero et al. 1994, p. 146), and fisher density estimates are widely variable for many reasons, including changes in prey populations, seasonal changes caused by pulses in births or mortalities, and sampling error (Powell and Zielinski. 1994, p. 43). Consequently, existing density estimates across the NCSO DPS, though variable over time and space, do not indicate any population declines. Effective population size estimates for the California portion of the DPS do not indicate that inbreeding depression is occurring (see Effects Associated with Small Population Size). This combination of qualitative demographic measures (i.e., population rebound from historic lows, and effective populations size estimates showing no indication of inbreeding depression), combined with the widespread distribution of fishers in the DPS, leads us to conclude that existing populations have a high level of resiliency.

Threats that cause losses of individuals from a population have the potential to affect the overall resiliency of that population, and when losses occur at a scale large enough that the overall population size and growth rate are negatively impacted, this could reduce the population's ability to withstand stochastic events. Although we identify threats acting upon the NCSO DPS that likely cause losses of individuals, evaluation of all the available information relevant to the demographic condition of the DPS supports our conclusion of resiliency. In addition to the analysis outlined above, we point to the evidence of population resilience exhibited by aggregates of individuals in specific geographic areas in the NCSO DPS in response to known disturbances or threats. Namely, fishers in the EKSA were resilient to removal of 20 percent of the population within the study area, with no changes in abundance or density. In addition, the fisher population at Stirling has grown at a near steady rate since reintroduction in spite of exposure to toxicants in 11 of 12 tested fishers in the study area (Powell et al. 2019, p. 16). Overall, the best available information indicates that, although the threats acting upon the DPS result in losses of individual fishers, the various subpopulations comprising the NCSO DPS, and hence the NCSO DPS as a whole, are resilient and able to withstand stochastic events.

With regard to redundancy, multiple, interacting populations across a broad geographic area or a single wide-ranging population (redundancy) provide insurance against the risk of extinction caused by catastrophic events. The NCSO DPS exhibits redundancy by being well distributed and common across a broad geographic range, and being comprised of multiple smaller subpopulations (i.e., NCSO, NSN, and SOC) and aggregates of individuals in geographic areas (i.e., EKSA fishers, fishers in and around Redwood National Park, Hoopa fishers, or fishers spread downslope of the Siskiyou Crest). Consequently, should catastrophic events such as wildfire affect a portion of the DPS, substantial numbers of fishers will still occur elsewhere in the DPS. Remaining fishers may continue to serve as a source for recolonizing disturbed areas as they return to fisher habitat, contributing to the probability that fishers in the DPS will persist into the future and contribute to the long-term genetic and demographic viability across the range.

Fishers in the NCSO DPS exhibit a high degree of representation as exhibited by ecological variability across the DPS. Fishers are found across multiple physiographic provinces (a geographic region with a specific geomorphology) in the NCSO DPS that represent a wide variety of forest types and ecological conditions, from the Coastal California province that is wetter with lower elevations and redwoods forests, to the Klamath province with greater forest diversity and abundant hardwoods, including several endemic tree and other plant species, to the Sierra and Cascade provinces with higher elevations and forests that have adapted to colder and drier conditions. Within the NCSO DPS, fishers have a capacity to occupy these different provinces and environments, reflecting an ability to adapt to changing environmental conditions, further contributing to long-term viability across their range. Although genetic diversity among fishers sampled in northwest California is low and has been low since pre-European settlement (Tucker et al. 2012, p. 8), fishers have rebounded from substantial population reductions that resulted from historical trapping and habitat loss, and they are currently widespread and common across the DPS.

Determination

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 "endangered species" or "threatened species." The Act defines an "endangered species" as a species that is "in danger of extinction throughout all or a significant portion of its range," and a "threatened species" as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether a species meets the definition of "endangered species" or "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

Our regulations direct us to determine if a species is endangered or threatened due to any one or combination of these five threat factors identified in the Act (50 CFR 424.11(c)). Our 2016 final Species Report (Service 2016, entire) is the most recent detailed compilation of fisher ecology and life history, and has a significant amount of analysis related to the potential impacts of threats within the NCSO DPS's range. In addition, we collected and evaluated new information available since 2016, including new information made available to us during the recent comment periods in 2019, to ensure a thorough analysis, as discussed above.

Across the DPS, the actions or conditions we identified that were known to or were reasonably likely to negatively affect individuals of the DPS included:

- Habitat-based threats such as high-severity wildfire, wildfire suppression activities, and post-fire management actions (Factor A); climate change (Factor E); tree mortality from drought, disease, and insect infestation (Factor A); vegetation management (Factor A); and human development (Factor A).

- Direct mortality-based threats including trapping and incidental capture (Factor B); research activities (Factor B); disease or predation (factor C); collision with vehicles (Factor E); exposure to toxicants (Factor E); and the potential for effects associated with small population size (Factor E).

With the exception of trapping for fishers, which is no longer a lawful activity in the range of the NCSO DPS, all of these identified threats have the potential to negatively affect fishers, either through direct impacts to individual animals or to the resources they need. Regarding incidental capture resulting from legal trapping for other species, it is either very rare (Service 2016, p. 126) or has a low chance of causing injury (through use of live traps). Regarding the remainder of threats, we note that the extent and magnitude of them vary, relative to the distribution of the DPS across its range (i.e., not all threats affect every fisher).

In conducting our status assessment of the DPS, we evaluate all identified threats under the section 4(a)(1) factors, and attempt to assess how the cumulative impact of all threats acts on the viability of the DPS as a whole. That is, all the anticipated effects from both habitat-based and direct mortality-based threats are examined in total and then evaluated in the context of what those combined negative effects will mean to the future condition of the DPS. However, for the vast majority of potential threats, the effect on the DPS (e.g., total losses of individual fishers or their habitat) cannot be quantified with available information. Instead, we use the best available information to gauge the magnitude of each individual threat on the DPS, and then assess how those effects combined (and as may be ameliorated by any existing regulatory mechanisms or conservation efforts) will impact the DPS's future viability.

Based on our understanding of the available information indicating the potential magnitude and scale of how all identified threats may affect the DPS, we began under the premise that those with the greatest potential to become significant drivers of the future status of the NCSO DPS were: wildfire and wildfire suppression; tree mortality from drought, disease, and insect infestation; the potential for climate change to exacerbate both wildfire and tree mortality; threats related to vegetation management; and exposure to toxicants. The available information about the remaining threats from the list identified above indicated a lower potential for becoming significant drivers.

After conducting our analyses on all these threats, we found that the NCSO DPS as a whole will experience:

- Changing climate conditions, likely in the manner of becoming generally warmer and drier, with subsequent potential to affect habitat conditions for fisher, as well as the potential for increased stress levels in individual fishers. However, these potential reactions to changing climate conditions will likely vary across the DPS, due to the DPS's wide variety of topography and vegetation in its physiographic provinces, and unpredictable variability in how these provinces will respond to the changing climate conditions.

- Increased potential for wildfire frequency and intensity, influenced by changing climate conditions. Wildfire, while having the potential to cause significant losses of fishers and their habitat resources where fires occur, is sporadic and episodic across the DPS, and moderated by the slope and aspect of terrain (e.g., influencing susceptibility to wildfire, and creating a mosaic of fire severity) throughout the range.

- Low likelihood of widespread tree mortality resulting from climate-influenced susceptibility to diseases or insect infestations, similarly moderated by the slope and aspect of terrain.

- Limited exposure to potential effects from vegetation management actions. Although fishers may experience localized fragmentation of habitat conditions or an increased risk of predation where vegetation management actions will occur, the available information indicates only a small proportion of the suitable habitat in the DPS's range is likely to undergo these actions.

- Some continued level of exposure to toxicants from illegal marijuana grow sites. Such sites are generally widely dispersed within remote landscapes across the NCSO DPS range, suggesting potential significant exposure to fishers is limited to where the grow sites are located. However, where they do occur within fisher ranges, illegally used toxicants have the potential to harm those exposed individual fishers. While there is no certain discernible trend regarding whether illegal grow sites may increase or decrease as a result of marijuana legalization, it will still likely take many years before the currently existing sites can be found and remediated.

- Some continued level of risk regarding both the effects associated with small population size (e.g., inbreeding depression) and the general risk of extinction. As we have described herein and previously, the NCSO DPS is isolated from other fisher populations, and small relative to the taxon as a whole. As such, the risks of small population size effects and of extinction exist. However, the broad distribution of the DPS across its range, in combination with the DPS occurring in multiple subpopulations with no barriers to genetic exchange within and between those subpopulations, and the low likelihood of a catastrophic event at a scale that could hypothetically affect the entire DPS, indicates that the risks of small population size effects and of extinction are very low.

- Potentially increased incidences of predation in localized settings (e.g. vegetation management action sites), and continued low incidences of collisions with vehicles. Both of these threats are likely to continue, but likely accounting for losses of only small numbers of individuals.
- No change in normal incidence of disease across the range.

In summary, the NCSO DPS will experience mortality and sub-lethal effects to individual fishers across the range from the combined threats of changing climate conditions, wildfire and wildfire suppression activities, exposure to toxicants, predation, and collisions with vehicles. Localized effects to fisher habitat resources may also occur as a result of future tree mortality events or vegetation management actions, although these will have a low likelihood of causing individual fisher losses. All these effects will be in addition to any mortalities or sub-lethal effects the DPS would typically experience from things such as age or disease.

At the same time as we conduct our evaluation of threats to the DPS, we also assessed how any existing regulatory mechanisms or conservation efforts are likely to eliminate or ameliorate the effects of those threats on the DPS. We provided our analyses of existing regulatory conservation measures and voluntary conservations efforts above in this document. In that discussion, we identified a number of measures that are likely to provide benefits to the DPS, either directly or indirectly, in the manner of maintaining or improving habitat conditions.

Federal and state agency management plans involving forest management, while designed, in part, for the harvesting of timber, also include provisions for the long-term maintenance of those forests, providing for the retention of forest habitat and structural elements beneficial to fishers. We also describe regulatory mechanisms at both the state and Federal level designed to minimize the potential for non-target poisoning by pesticides, as well as state and voluntary efforts to remediate illegal marijuana sites contaminated by rodenticides. In addition, implementation of existing conservation measures in the form of a recently signed MOU will improve communication and coordination surrounding the implementation of fuels reduction projects, which in turn may help to ameliorate the loss of habitat due to wildfire. This will contribute to the vegetation management threat in the form of removing fisher habitat in the short- or long-term, depending on the treatment. However, by retaining structural elements important to fishers and their prey, the treatments are expected to reduce the risk of fisher habitat loss to severe wildfires over an area much larger than the treatment footprint.

As noted earlier, there is no information available that would allow us to quantify either the cumulative effect of the identified threats on the DPS, or the cumulative effect of existing regulatory mechanisms or conservation efforts to ameliorate the effects of those threats. However, in evaluating the anticipated impact of both in total, we find that the sum of effects to the DPS are such that: the resiliency of the various subpopulations, and hence the DPS as a whole, will not be significantly negatively affected; its representation, i.e., its breadth of genetic and environmental diversity, will not be reduced; and its redundancy will remain as it currently is, with multiple subpopulations distributed across a substantial range of habitat.

Upon careful consideration and evaluation of all of the information before us, we have analyzed the status of fishers within the NCSO DPS. In our 2019 Revised Proposed Rule, we evaluated the status of the West Coast DPS, the NCSO DPS and SSN DPS combined, and concluded that both the NCSO and SSN were reduced in size from historical conditions, and that threats were acting on fishers across the range of both. However, we also noted that the distribution of threats and their effects, both singly and cumulatively, were likely unequal in magnitude and scale across the full landscape. While multiple threats such as wildfire and wildfire suppression activities, climate change, exposure to toxicants, predation, and vehicle collisions will continue to occur within the range of the NCSO DPS, we conclude that the cumulative effect of threats acting on the DPS now, at their current scale and magnitude, does not cause the DPS to be in danger of extinction throughout its range, especially given the DPS's overall resiliency, redundancy, and representation. In addition, we conclude that the identified threats will not increase in scale or magnitude in the foreseeable future such that the DPS will become in danger of extinction throughout its range. Thus, after assessing the best available scientific and commercial information, we determine that the NCSO DPS of fishers is not in danger of extinction throughout its range, nor likely to become so in the foreseeable future.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. Having determined that the NCSO DPS of fisher is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so in the foreseeable future in a significant portion of its range. The range of a species or DPS can theoretically be divided into portions in an infinite number of ways, so we first screen the potential portions of the range to determine if there are any portions that warrant further consideration. To do the "screening" analysis, we ask whether there are portions of the DPS's range for which there is substantial information indicating that: (1) the portion may be significant; and, (2) the species may be, in that portion, either in danger of extinction or likely to become so in the foreseeable future. For a particular portion, if we cannot answer both questions in the affirmative, then that portion does not warrant further consideration and the species does not warrant listing because of its status in that portion of its range. Conversely, we emphasize that answering both of these questions in the affirmative is not a determination that the species is in danger of extinction or likely to become so in the foreseeable future throughout a significant portion of its range—rather, it is a threshold step to determine whether a more-detailed analysis of the issue is required.

If we answer these questions in the affirmative, we then conduct a more thorough analysis to determine whether the portion does indeed meet both of the "significant portion of its range" prongs: (1) the portion is significant and (2) the species is, in that portion, either in danger of extinction or likely to become so in the foreseeable future. Confirmation that a portion does indeed meet one of these prongs does not create a presumption, prejudgment, or other determination as to whether the species is an endangered species or threatened species. Rather, we must then undertake a more detailed analysis of the other prong to make that determination. Only if the portion does indeed meet both prongs would the species warrant listing because of its status in a significant portion of its range.

At both stages in this process—the stage of screening potential portions to identify any that warrant further consideration, and the stage of undertaking the more detailed analysis of any portions that do warrant further consideration—it might be more efficient for us to address the "significance" question or the "status" question first. Our selection of which question to address first for a particular portion depends on the biology of the species, its range, and the threats it faces. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the second question for that portion of the species' range.

For the NCSO DPS, we chose to address the status question (i.e., identifying portions where the DPS may be in danger of extinction or likely to become so in the foreseeable future) first. To conduct this screening, we considered whether any of the threats acting on the DPS are geographically concentrated in any portion of the range at a biologically meaningful scale (e.g., there are novel threats not seen elsewhere in the DPS; there is a greater concentration or intensity of threats, relative to the same threats seen elsewhere in the range; or there is a disproportionate response to the threats by the individuals in a portion of the range, relative to individuals in the remainder of the range).

In our assessment of the NCSO DPS's overall status, we evaluated throughout its range all of the threats identified in our Species Report, including those with the potential to become significant drivers of the DPS's future status: high-severity wildfire, wildfire suppression activities, and post-fire management actions (Factor A); climate change (Factor A); tree mortality from drought, disease, and insect infestation (Factor A); vegetation management (Factor A);. exposure to toxicants (Factor E); and potential effects associated with small population size (Factor E). As we conducted our threats analysis, we determined that the most significant drivers of the NCSO DPS's future status were: wildfire and wildfire suppression, and the potential for climate change to exacerbate this threat, as well as the threats related to vegetation management and exposure to toxicants. However, for the purposes of our SPR analysis, we examined the entirety of the DPS to evaluate whether there may be a geographic concentration of any of the identified threats in any portion of the range at a biologically meaningful scale.

We found no concentration of any of these threats in any portion of the NCSO DPS's range at a biologically meaningful scale. While high-severity wildfires, and associated suppression activities and post-fire management, act in a site-specific manner, the occurrence of them in the DPS's range is random (i.e., not geographically concentrated in any portion), and we cannot predict what portions within the range of the NCSO DPS where these may occur. Similarly, climate change, and its associated influence on the potential threat of wildfires, will largely act throughout the NCSO DPS range. All other potential threats either present a risk of manifesting randomly in small, localized places across the range (e.g., toxicant exposure, disease or predation, and vehicle collisions), or manifesting in a focused manner, but still only having localized, site-specific effects (e.g., vegetation management). Regarding small population size, the potential for negative effects can arise in portions of a species' range in instances where there are small, isolated aggregations of individuals. However, there is no evidence to suggest that there are any areas within the NCSO DPS that are experiencing the deleterious effects associated with a small population size.

If both (1) a species is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range and (2) the threats to the species are essentially uniform throughout its range, then the species can not be in danger of extinction or likely to become so in the foreseeable future in any biologically meaningful portion of the DPS. For the NCSO DPS, we found both: the DPS is not in danger of extinction or likely to become so in the foreseeable future throughout its range, and there is no geographical concentration of threats within the DPS at a biologically meaningful scale, so the threats to the DPS are essentially uniform throughout its range. Therefore, we determine, based on this screening analysis, that no portions warrant further consideration through a more detailed analysis, and the DPS is not in danger of extinction or likely to become so in the foreseeable future in any significant portion of its range. Our approach to analyzing significant portions of the DPS's range in this determination is consistent with the court's holding in *Desert Survivors* v. *Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018); *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d , 946, 959 (D. Ariz. 2017); and *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020).

Determination of Status

Our review of the best available scientific and commercial information indicates that the NCSO DPS of fisher does not meet the definition of an endangered species or a threatened species in accordance with section 3(6) and 3(19) of the Act. Therefore, we find that listing the NCSO DPS of fisher is not warranted at this time.

Final Listing Determination for SSN

Current Condition

The SSN DPS of fisher is small and is geographically separated from the remainder of the species as described above in the DPS section. While this DPS has persisted in isolation since prior to European settlement (Knaus *et al.* 2011, entire), the DPS has recently experienced substantial loss of habitat and increase in habitat fragmentation following the 2012-2015 drought (Thomspon *et al.* 2019a pp. 8-9). This period of drought and associated insect infestation, fire, and tree mortality has resulted in a 39% decline in fisher foraging and denning habitat in the SSN DPS in a period of five years (Thomspon *et al.* 2019a pp. 8-9). The remaining habitat is much more fragmented (74 habitat patches prior to the drought compared with 558 following the drought) and the average patch size of remaining habitat for the SSN DPS is 92% smaller than prior to the 2012-2015 drought (Thomspon *et al.* 2019a pp. 8-9).

The SSN DPS is found in Mariposa, Madera, Fresno, Tulare, and Kern Counties in California. Historically, the SSN DPS likely extended farther north, but may have contracted due to unregulated trapping, predator-control efforts, habitat loss and fragmentation, or climatic changes. Today the approximate northern boundary is the Tuolumne River in Yosemite National Park (Mariposa County) and the southern limit is the forested lands abutting the Kern River Canyon, while the eastern limit is the high-elevation, granite-dominated mountains, and the western limit is the low-elevation extent of mixed-conifer forest. Multiple lines of genetic evidence suggest that the isolation of the SSN DPS from other populations of native fishers to the north in California is longstanding and predates European settlement (Knaus *et al.* 2011, entire; Tucker *et al.* 2012, entire; Tucker 2015, pers. comm., pp. 1–2).Ownership within the SSN DPS is shown in Table 3 below.

Table 3. Land ownership or management for the Southern Sierra Nevada Distinct Population Segment of fisher.

Agency	Acres	Percent
Bureau of Land Management	916,152	9.8
Forest Service	3,637,488	39.0
Bureau of Indian Affairs	56,003	0.6
National Park Service	1,337,482	14.4
State and Local	42,123	0.5
Private	3,099,276	33.3
Total Acres*	9,318,596	100.0

* Acres and % may not sum due to rounding and because some other owners with less land are not included.

Estimates for the SSN DPS prior to the 2012-2015 drought range from a low of 100 to a high of 500 individuals (Lamberson *et al.* 2000, entire). A recent estimate of 256 female fishers was based on habitat availability at the time (Spencer *et al.* 2016, p. 44). Other population estimates are: (1) 125–250 adult fishers based on fisher carrying capacity in currently occupied areas (Spencer *et al.* 2011, p. 788); and (2) fewer than 300 adult fishers or 276–359 fishers that include juveniles and subadults based on extrapolation from portions of the DPS where fishers have been intensely studied to the range of the entire population (Spencer *et al.* 2011, pp. 801–

802). These population estimates pre-date the 2012-2015 drought and subsequent habitat loss and fragmentation; these drought-related effects may have caused population declines since the population estimates of the early 2000's.

An 8-year monitoring study throughout the SSN DPS sampled an average of 139.5 units (range 90–189) comprised of six baited track plate stations per year during the period 2002–2009 throughout the SSN DPS showed no declining trend in occupancy (Zielinski *et al.* 2013, pp. 3-4, 10–14; Tucker 2013, pp. 82, 86–91). Recent analyses conducted over a 14-year period (2002-2015) showed that occupancy rates in 2015 were not statistically different from 2002, although rates dipped slightly from 2005-2011 (Tucker 2019 pers. comm.). Although occupancy patterns show no declining trends, these analyses do not provide details on demographic rates, such as survival and recruitment that provide more detailed information on population growth rates, size, or status. As with the population estimates described above, these patterns in occupancy were calculated prior to the 2012-2015 drought and subsequent 39% reduction in foraging and denning habitat and associated habitat fragmentation. It is unknown how occupancy and survival across the range of the SSN DPS of fisher have changed in response to these changes in their habitat.

Another study (SNAMP Fisher Project) of radio-collared fishers monitored from 2007 through 2014 in the northern portion of the SSN DPS on 49 mi^2 (128 km^2) of the Sierra National Forest showed the survival rate (calculated using demographic parameters) of adult males, but not females, is lower than sites in the NCSO DPS. Specifically, Sweitzer *et al.* stated that their analysis "suggested slightly negative growth ($\lambda = 0.966$) for the period of the research. The upper range for λ (1.155) was well above 1.0, however, suggesting stability or growth in some years. The estimated range for λ was consistent with the estimated population densities, which did not indicate a persistent decline during 4 years from 2008–2009 to 2011–2012" (Sweitzer *et al.* 2015a p. 781–783; Sweitzer *et al.* 2015b, p. 10). Additionally, the SNAMP Fisher Project (later called Sugar Pine) was extended through 2017. They reanalyzed the data for radio-collared fishers monitored from 2007 through 2017 (totaling 139 collared fishers) and concluded the population was stable with an estimated lambda of 0.99 (C.I. 0.826 to 1.104) based on female fisher survival rates (Purcell *et al.* 2018, pp. 5-6, 17). These population estimates for the SSN DPS do not take into consideration the extensive tree mortality, habitat loss, and fragmentation that has impacted habitat from 2015 to present. Research is currently being conducted to determine any potential effects that tree mortality may have on fisher in the SSN DPS, but results are not yet available (Green *et al.* 2019a, entire).

Extensive areas of suitable habitat within the SSN DPS remain unoccupied by fishers, suggesting that habitat may not be the only limiting factor for this DPS (Spencer *et al.* 2015, p. 9). In the SSN DPS, the northern portion of the Stanislaus National Forest is largely unoccupied, with at least one confirmed detection north of the Merced River in Yosemite National Park and the Stanislaus National Forest (Stock 2020 pers. comm.). The interaction of all the threats within the SSN DPS are likely limiting northward expansion into what is considered suitable habitat for fisher. Fisher habitat is lacking landscape scale forest heterogeneity in the SSN DPS compared to historical conditions, with wildfire and severe drought disturbances creating large patches of homogenous habitat, a situation exacerbated by past logging practices and wildfire suppression (Thompson *et al.* 2019a, p. 13).

Recent habitat changes from drought, wildfire, and associated tree mortality are affecting many of the key components of fisher habitat such as complex forest canopy structure and connected closed-canopy forest conditions. Only preliminary analyses have been completed with updated vegetation information from 2016, revealing that almost 40 percent (reduction - 2.3 million acres to 1.4 million acres) of potential fisher foraging habitat has been lost to drought, insects and tree diseases, and wildfire between 2014 and 2016 (Thompson *et al.* 2019a, pp. 7-8). The spatial configuration of fisher foraging habitat also changed, with patch number increasing from 74 to 558 and patch size declining from 31,500 ac (12,748 ha) to 2,600 ac (1,052 ha), indicating a significantly more fragmented landscape (Thompson *et al.* 2019a, p. 8). Within the same affected area (i.e. not an additive loss), denning habitat availability also declined by almost 40 percent and overall patch size declined from 3,169 ac (1,283 ha) to 2,868 ac (1,161 ha) (Thompson *et al.* 2019a, p. 9). Current efforts are underway to incorporate the most recent and precise vegetation data into a full revision of the SSN Fisher Conservation Strategy in 2020 (Thompson 2020, personal communication).

The major threats for the SSN DPS are loss and fragmentation of habitat resulting from climate change, high-severity wildfire and wildfire-suppression activities, vegetation management, and forest insects and tree diseases, as well as direct impacts that include high mortality rates from predation, exposure to toxicants, and potential effects associated with small population size. Potential conservation measures are discussed in more detail in *Voluntary Conservation Mechanisms* below, and include the development of the Southern Sierra Nevada Fisher Conservation Strategy (Spencer *et al.* 2016, entire) and the associated interim guidelines that consider the recent tree mortality (Thompson *et al.* 2019a, entire).

Threats

Potential threats currently acting upon the SSN DPS of fisher or likely to affect the species in the future are evaluated and addressed in the final Species Report (Service 2016, pp. 53–162). Our most recent consideration of new data since 2016 coupled with our reevaluation of the entirety of the best available scientific and commercial information (including comments and information received during the two comments periods associated with the 2019 Revised Proposed Rule) is represented and summarized here.

As we conducted our threats analysis, we determined that the most significant drivers of the species' future status were: wildfire and wildfire suppression, tree mortality from drought, disease, and insect infestation, and the potential for climate change to exacerbate both of these threats, as well as the threats related to vegetation management, exposure to toxicants, disease or predation, collisions with vehicles, and the potential for effects from small population size. While our assessment of the species' status was based on the cumulative impact of all identified threats, as explained above, we are only presenting our analyses on these specific primary threat drivers for the purposes of this final rule. For detailed analyses of all the other individual threats, we refer the reader to the Species Report (Service 2016, entire).

Wildfire and Wildfire Suppression

Wildfire is a natural ecological process in the range of the SSN DPS; however, the mean proportion of high-severity fire and patch size have shifted compared to historical conditions (Safford and Stevens 2017, p. viii.) with increases in the frequency of large wildfires greater than 24,700 acres (9,996 (ha) (Westerling 2016, pp. 6–7). Changes in future climate continue to predict large increases in the area burned by wildfire (Dettinger *et al.* 2018, p. 72). We expect these predicted changes to the fire regime to further reduce the habitat available for fisher in the SSN DPS (see Climate Change section for further detail on future conditions). We recognize there are mixed findings as to whether current conditions are outside of the natural range of variation and wildfire severity is increasing (Mallek *et al.* 2013, p. 11–17; Stephens *et al.* 2015, p. 12–16; Hanson and Odion 2016, p. 12–17; Odion *et al.* 2016, entire; Spies *et al.* 2018, p. 140), but the scientific consensus accepts that mixed conifer forests were characterized by areas burned at low-, moderate-, and high-severity, with higher proportions of low-severity prior to European settlement than is currently being observed on the landscape (Safford and Stevens 2017, p. 48-50).

Recent analyses show habitat loss from high-severity fire throughout the SSN DPS (Thompson *et al.* 2019a, p. 10). For this new analysis of effects of wildfire on fisher habitat in the southern Sierra Nevada, high-severity-fire data was analyzed from 2003 to 2017 (CBI 2019a, pp. 26–28) and showed a loss of fisher denning (8.5 percent), resting (9.3 percent), and foraging (7.6 percent) habitat of approximately 25 percent, with most of the loss occurring between 2013 and 2017 (approximately 22 percent) (CBI 2019a, p. 28). However, some areas of denning, resting, and foraging habitat overlap each other, so the total amount of habitat lost to high-severity fire is likely less than 25 percent. In addition, the wildfires occurring on the Sierra and Sequoia National Forests bisected and disrupted connectivity between—or reduced the overall size of—key core areas as identified in the SSN fisher conservation strategy, likely inhibiting northward population expansion (Spencer *et al.* 2016, p. 10; CBI 2019a, pp. 26–28). It is uncertain how fishers are using this changed landscape.

Prior to these substantial habitat changes as a result of recent fire, fishers persisted in burned landscapes characterized by lower fire severities that maintained habitat elements important to fisher. For example, the northern portion of the SSN DPS had lower fisher occupancy in units burned by either prescribed burning or wildfire but less than 1 percent of the study area burned; however, there was no consistent negative effect of fire on fisher's use of habitat(Sweitzer *et al.* 2016b pp. 208, 214, and 221-222). Results of modeling the variables of forest structure important to fishers for denning habitat on the Sierra National Forest and Yosemite National Park suggest that suitable denning habitat is maintained in burned forests, though primarily those with low-severity wildfire conditions, as less than 5 percent of areas burned at high severity were associated with a high probability of fisher den presence (Blomdahl 2018, entire). Thus, forests that burn at lower fire intensities can create important habitat elements for fisher (e.g., den trees) within a home range such that the burned habitat may continue to support both fisher foraging and reproduction.

Fisher avoided areas affected by high- and moderate-severity wildfires in the French (2014) and Aspen Fires (2013) and there was a higher probability of finding fishers in ravines or canyon bottoms in combination with unburned or lightly burned patches (Thompson *et al.* 2019a, pp. 13–14). In our final Species Report we reported fisher use of areas affected by high-severity fire (Hanson 2015, p. 500; Service 2016, p. 66), so results from these studies may differ due to the type of analysis used, the values chosen to identify wildfire severity classes, or the 2–4 year vs. 10-year post-wildfire sampling period (Thompson *et al.* 2019a, pp. 15–18). Without demographic data on age class, survival, or reproduction, it is difficult to say with certainty whether fisher use of post-wildfire landscapes is for dispersal or whether such areas act as population sinks (Thompson *et al.* 2019a, pp. 17–18).

As stated above, wildfire has already resulted in habitat loss and is increasing in terms of frequency, severity, and magnitude in the Sierra Nevada. We conclude that if the severity and extent of wildfires are such that substantial areas of canopy and large trees are lost, multiple decades of forest growth and structural development are necessary for those burned areas to support fisher reproduction. Therefore, based on the research and data currently available (as described above and in Service 2014, p. 64; Sequoia Forest Keeper 2019, pers. comm.; Spencer *et al.* 2016, p. 10), large high-severity fires that kill trees and significantly reduce canopy cover in fisher habitat (of high and intermediate quality) are likely to negatively affect fisher occupancy and reproduction. The degree to which wildfire affects fisher populations depends on the forest type, landscape location, patch configuration, size, and intensity of the wildfire.

Climate Change

In the Sierra Nevada region, mean annual temperatures have generally increased by around 1 to 2.5 degrees °F (0.5 to1.4 °C) over the past 75–100 years (Safford *et al.* 2012, p. 25). By the end of the 21st century, temperatures are projected to warm within the SSN DPS by 6 to 9 °F (3.3 to 5 °C) on average, enough to raise the transition from snow to rain during a storm by about 1,500 to 3,000 ft (457 to 914 m) (Dettinger *et al.* 2018, p. 5). In addition, California recently experienced extreme drought conditions due to lack of precipitation from 2007–2009 and from 2012–2014 (Williams *et al.* 2015, p. 6823–6824). Climate change likely contributed to the 2012–2014 drought anomaly, and increases the overall likelihood of drier conditions, including extreme droughts, within the SSN DPS into the future (Williams *et al.* 2015, p. 6819, 6826; Bedsworth *et al.* 2018, p. 25).

The observed increases in wildfire activity and tree mortality in the SSN DPS are partially due to climate change. The red fir forests in the SSN DPS, currently found at the upper edge of fisher elevation range, are expected to have more frequent fire with species composition shifting to more fire-prone species, but it is unclear whether these forests will become more central to the range of fisher with warming climate conditions or if it will remain on the elevation edge of the SSN DPS (Restaino and Safford 2018, p. 497; Service 2016, p. 87, 138–139). Climate change will likely continue to increase tree-mortality events into the future because drought conditions will increase, which will continue to weaken trees and make them susceptible to bark beetles and disease (Millar and Stephenson 2015, p. 823–826; Young *et al.* 2017, p. 78, 85).

Overall, at this time, the best available scientific and commercial information suggest that changing climate conditions (particularly increasing air temperatures coupled with prolonged and more frequent drought conditions) are exacerbating other threats to the fishers and their habitat within the SSN DPS, including high-severity wildfires, and tree mortality. Please see additional discussion about potential impacts to fishers or their habitat associated with wildfire ("Wildfire and Wildfire Suppression" above) and tree mortality ("Tree Mortality from Drought, Disease, and Insect Infestation" below).

Tree Mortality from Drought, Disease, and Insect Infestation

The recent drought and subsequent beetle outbreak in the Southern Sierra Nevada from 2012 to 2015 is one of the most severe and largest beetle outbreaks in recent decades (Fettig *et* *al.* 2019, p. 176). Over half of the potential fisher habitat in the SSN DPS has been significantly impacted by canopy loss from tree mortality, which is disproportionately affecting the largest conifer trees and which are most likely to serve as den or rest trees for fisher (CBI 2019a, p. 3–9, 29; Fettig *et al.* 2019, p. 167–168). Although fisher often use hardwoods for denning and resting, conifers appear to be more important for denning and resting in the SSN DPS than other fisher populations, and overall den-tree size is much larger than other portions of the fisher range, so the loss of large trees has the potential to disproportionately alter den availability in the landscape (Green *et al.* 2019c, p. 139). Drought effects on over 6 million hectares of forest in California occurred over a multi-year period from 2011-2015 and over 500 million large trees have been affected, primarily from canopy water content loss, with some of the largest impacts to forested areas within the range of the SSN DPS (Asner *et al.* 2016, p. E252). These trees, spread over millions of hectares of forest, are more vulnerable in future droughts, likely resulting in death and altering future forest structure, composition, and function (Asner *et al.* 2016, p. E253; Fettig *et al.* 2018, p. 176).

There is limited information on the direct impacts to fisher from tree mortality; however, the combination of drought, forest insects, disease, and fire has led to a 39 percent decrease in available foraging and denning habitat along with a substantial increase in habitat fragmentation and 92 percent reduction in average habitat patch size, both of these effects occurred over a period of approximately five years (Thompson *et al.* 2019b, pp. 8–9). The habitat changes associated with drought, forest insects, disease, and fire may result in increased use of areas by large predators that in turn could increase predation rates on fisher (Thompson *et al.* 2019b, p. 15; also see "Predation and Disease" above in the "General Species Information and Summary of

Threats" above). The usual pattern of localized outbreaks and low density of tree-consuming insects and tree diseases are beneficial and can create snags, providing structures conducive to rest and den site use by fishers or their prey. The large-scale beetle kill is concerning because USFS personnel are already reporting snag failures, indicating these snags may fall at a faster rate than other methods of snag creation (e.g., wind, fire, age; Larvie *et al.* 2019, p. 11). Further, large, area-wide epidemics of forest disease and insect outbreaks may displace fishers if canopy cover is lost and salvage and thinning prescriptions in response to outbreaks degrade the habitat (Naney *et al.* 2012, p. 36; Tucker 2019, personal communication).

Preliminary information in the SSN DPS indicates fishers are avoiding areas with tree mortality and are more likely to be found in areas close to streams, drainages, and ravines where tree mortality effects were dampened (Green *et al.* 2019a, entire). In addition, increased tree mortality on the landscape may be associated with reduced female fisher survival within the SSN population due to increased stress hormones (cortisol) (Kordosky 2019, p. 31–34, 36–40, 54–61, 65–68, 94); however, reduced fisher survival is also likely influenced by other factors. Although other studies indicate fishers tolerate certain levels of canopy loss in small-scale projects, fisher response to tree mortality may have been influenced by the large scale of the tree-mortality event (Thompson *et al.* 2019a, p. 16).

Loss of canopy cover and large trees from tree mortality caused by insects and tree diseases likely reduces habitat suitability for fishers, but it is unknown if the level of habitat loss will significantly impact the SSN DPS throughout its range. Although fishers are using riparian areas with intact forest canopy, it is uncertain how patches with sufficient canopy cover are connected in this changing landscape. It is likely that tree mortality will continue to be a threat into the future 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, p. 823–826; Young *et al.* 2017, p. 78, 85), therefore we expect continued loss and fragmentation of remaining habitat across the range of the SSN DPS of fisher.

Vegetation Management

In the SSN DPS, we approximated fisher habitat change using a vegetation trend analysis to track changes in forests with large structural conditions thought to be associated with fisher habitat (Service 2016, p. 98-101). Available data limited us to using predefined structure conditions describing forests with larger trees (greater than 20 in (50 cm)), although we realize this may not include all vegetation types used by fishers. This analysis showed that net loss of forests with larger structural conditions in the SSN DPS from 1993 to 2012 was 6.2 percent across all ownerships, which equates to a loss of 3.1 percent per decade.

In the single analysis where fisher habitat was actually modeled and tracked through time for the SSN DPS, ingrowth of fisher habitat replaced habitat lost by all disturbances between 1990 and 2012, showing a net increase in fisher habitat at the female-home-range scale, albeit this net increase is less than 8 percent over 30 years (Spencer *et al.* 2016, p. 44, A–21, A-26). However, the authors of this report have since cautioned that these conclusions may no longer be accurate based on the "dramatic changes [that] have occurred in Sierra Nevada mixed conifer forests due to drought and extraordinary tree mortality" from the 2012–2015 drought (Spencer *et al.* 2017, p. 1). Consequently, they recommended delaying application of habitat-conservation targets until vegetation data can be updated and fisher habitat condition reassessed (Spencer *et* *al.* 2017, p. 1–2). Hence, although our earlier analysis concluded that fisher habitat in the SSN DPS may be increasing, we can no longer support that conclusion based on recent tree mortality.

Vegetation management that maintains structural complexity and canopy cover that reflect pretreatment conditions may only have a minor impact on fisher use of these habitats (Purcell *et al.* 2018, p. 60). Overall, vegetation management may result in short-term avoidance of fuels reduction treatments, with no longer-term shift in fisher behavior, but likely depends on the amount treated each year (Purcell *et al.* 2018, p. 69).

On all ownerships combined, loss of forest with old-forest structures in the past two decades (1993-2012) was 3.1 percent per decade as a result of all disturbance types within the SSN DPS. Additionally, fisher habitat appeared to be increasing until recent (2012–2015) tree mortality due to fires and drought. However, it is difficult to conclude the degree to which vegetation management threatens fishers in the SSN DPS. Given the large home range of fishers and the geographic extent of forest-management activities throughout the range of the SSN DPS, some fisher individuals are likely affected as a result of habitat impacts (e.g., Purcell *et al.* 2018, p. 60–61). In addition, still other factors unrelated to habitat may be limiting fisher distribution. Consequently, based on the best available scientific and commercial information, we find that vegetation management effects to fisher will depend on the spatial distribution of the activities and whether structural elements important to fishers are maintained. Although vegetation management may threaten fisher now and in the foreseeable future, many of the effects are likely exacerbated by other forms of habitat loss such as tree mortality from drought and severe wildfires.

Exposure to Toxicants

As described above in the general threats section, rodenticides analyzed as a threat to the SSN DPS of fishers include first- and second-generation anticoagulant rodenticides and neurotoxicant rodenticides. Both the draft and final Species Reports detail the exposure of the SSN DPS of fishers to rodenticides in the Sierra Nevada (Service 2014, p. 149–166; Service 2016, p. 141–159). Data available since the completion of the final Species Report in 2016 continue to document exposure and mortalities to fishers from rodenticides in the SSN DPS (Gabriel and Wengert 2019, unpublished data, entire). Data for 97 fisher carcasses collected in the range of SSN DPS in the period 2007–2018 indicate 83 fishers (86 percent) tested positive for one or more rodenticides (Gabriel and Wengert 2019, unpublished data), while 5.2 percent of known-cause SSN DPS fisher deaths from 2007 through 2014 were attributable to rodenticide toxicosis (6 of 115 total known-cause mortalities) (Gabriel et al 2015, p. 6). The probability of fisher mortality increases with the number of anticoagulant rodenticides to which a fisher has been exposed (Gabriel *et al.* 2015, p. 15). Mortalities due to rodenticide toxicosis have increased from 5.6 to 18.7 percent since collection and testing of fisher mortalities began in 2007 (Gabriel and Wengert 2019, unpublished data). From 2015 to 2018, additional SSN DPS fisher mortalities due to both anticoagulant and neurotoxicant rodenticides have been documented (Gabriel and Wengert 2019, unpublished data, p. 4).

In order to evaluate the risk to SSN DPS fishers from illegal grow sites, we use a Maximum Entropy model that was developed to identify high and moderate likelihood of illegal grow sites within habitat selected for by fisher (Gabriel and Wengert 2019, unpublished data, p. 7–10). This model indicates that 22 percent of habitat modeled for SSN DPS fishers is within areas of high and moderate likelihood for marijuana cultivation. The extent to which the use of toxicants occurs on legal private land grow sites within the SSN DPS, as well as other agricultural, commercial, and public land sites within the range of the SSN DPS of fisher (and habitats that fishers select for) is unknown.

At this time, our evaluation of the best available scientific and commercial information regarding toxicants and their effects on fishers leads us to conclude that individual fishers within the SSN DPS have died from toxicant exposure. Data indicate a total of 19 mortalities specifically within the monitored fisher populations (in both NCSO and SSN DPSs in California) have been directly caused by toxicant exposure (Gabriel and Wengert 2019, unpublished data, p. 5). We view toxicants as a potentially significant threat given the small population size of the SSN DPS fishers because of the reported exposure rate of toxicants in the SSN DPS, reported mortalities of SSN DPS fishers from toxicants, the variety of potential sublethal effects due to exposure to rodenticides (including potential reduced ability to capture prey and avoid predators), and the degree to which illegal grow sites overlap with the range and habitat of the SSN DPS of fisher.

The effect of these impacts to the SSN DPS is of particular concern because of the small number of individuals in the SSN DPS. The exposure rate of more than 80 percent of fisher carcasses tested in the SSN DPS has not declined between 2007 and 2018 (Gabriel and Wengert 2019, unpublished data, p. 3–4), while toxicosis has increased since 2007 (Gabriel *et al.* 2015, p. 6-7). We do not know the exposure rate of live fishers to toxicants because this data is difficult to collect. The minimum amount of anticoagulant and neurotoxicant rodenticides required for sublethal or lethal poisoning of fishers is currently unknown; however, we have evidence of fisher mortality and sublethal effects as a result of rodenticides. Although uncertainty existing in the effect of toxicants on the SSN DPS, in a small population such as the SSN DPS of fisher, the lethal and sublethal effects of toxicants on individuals have the potential to have population-level effects and reduce the resiliency of the DPS as a whole. Overall, rodenticides are a threat to fisher within the SSN DPS now and in the foreseeable future.

Potential for Effects Associated With Small Population Size

The SSN DPS exhibits the following attributes related to small population size, to varying degrees, which may affect their distribution and population growth:

(1) Loss of large contiguous areas of historical habitat, including a 39 percent loss of foraging and denning habitat over the past five years (Thompson et al. 2019b, p. 9), in combination with restriction of the species to forested habitats that have been lost or modified due to timber-harvest practices; large, high-severity wildfires whose frequency and intensity are in turn influenced by the effects of climate change; and increasing forest fuel density from fire suppression and a lack of low-severity fire over the recent long term.

(2) Dependence on specific elements of forest structure that may be limited on the landscape, including microsites for denning and resting.

(3) Susceptibility to injury or mortality due to predation from co-occurring larger predators.

Each of these vulnerabilities may separately, or together, influence the magnitude of other threats described in this analysis for the SSN DPS of fisher.

Some information is available that demonstrates fisher's vulnerability to small population effects in the SSN DPS, including overall low genetic diversity (mitochondrial DNA haplotype and nuclear DNA allelic richness) for the entire SSN DPS, limited gene flow, and existing barriers to dispersal (Wisely *et al.* 2004, p. 642–643; Knaus *et al.* 2011, p. 7; see also additional discussion in Service 2016, p. 134–137; Tucker *et al.* 2014, p. 131-134), albeit some of these barriers allow some gene flow (Tucker *et al.* 2014, p. 131). However, the recent tree mortality and several recent large-scale fires acting on the narrow, linear range of the SSN DPS have resulted in substantial habitat fragmentation and reduction in habitat patch size (Thompson et al. 2019b, pp. 8-9) and are likely to increase barriers to dispersal, potentially limiting movement among habitat patches and preventing northward expansion, particularly for females, given female dispersal and associated genetic connectivity is facilitated by dense forest habitat (Tucker *et al.* 2017, p. 10).

At this point in time, the SSN DPS is considered relatively small, especially when taking into account the original/historical range of the species within the West Coast states, and the population growth rates does not indicate that the SSN DPS is increasing. The recent post-drought declines in foraging and denning habitat and associated habitat fragmentation further isolate the SSN DPS from other fishers and limit the opportunities for movement among remaining patches within the range of the SSN DPS. The best available information suggests the SSN DPS is expected to remain isolated from other fisher (as has been apparent since pre-European settlement). The SSN DPS is likely to remain small or be reduced even further into the future, primarily given the other stressors that have the potential to exacerbate the impacts from threats on small populations. In addition, average litter size for the SSN DPS is the lowest reported for the species, potentially due to diet limitations, smaller body size, and lower genetic diversity compared to other populations (Green *et al.* 2018a, p. 545, 547). Estimates of fisher population growth rates for the SSN DPS do not indicate any overall positive or negative trend.

Population estimates for the SSN DPS of fisher prior to recent fires, drought and tree mortality and subsequent 39 percent loss of foraging and denning habitat range anywhere in size from 100 to 500 individuals (Service 2016, p. 48–50). Population-growth-rate analyses have been estimated as 0.97 (C.I. 0.79–1.16) from 2007-2014 throughout the SSN DPS (Sweitzer *et al.* 2015a, p. 784), and more recently 0.99 (C.I. 0.826 to 1.104) from 2007-2017 in a small portion of the SSN DPS at Sugar Pine (Purcell *et al.* 2018, p. 5-6, 17). Available population estimates and trend information for the SSN DPS does not take into consideration extensive tree mortality that has impacted the habitat from 2015 to present. Research is currently being conducted to determine any potential effects that tree mortality may be having on the SSN DPS, but results are not yet available (Green *et al.* 2019a, entire). At this point in time, we do not have sufficient information to predict whether population trends of the SSN DPS will be positive or negative into the foreseeable future; however we anticipate continued loss and fragmentation of fisher habitat.

Overall, a species (or DPS) with relatively few individuals may be of concern when there are significant threats to the species. The SSN DPS is considered relatively small and has not appeared to grow or expand, despite the availability of unoccupied suitable habitat. The SSN DPS has been found to have relatively low genetic diversity, but there is currently no evidence of inbreeding depression. The small population may make the SSN DPS more vulnerable to threats, but there is no evidence at this time that small populations are causing impacts such loss of genetic variability or large fluctuations in demographic parameters of the SSN DPS.

Disease and Predation

A general description of disease and predation on fishers overall was provided earlier (see "General Species Information and Summary of Threats" above). Specific to the SSN DPS, of 94 fisher mortalities analyzed, 71 percent were a result of predation and 14 percent were caused by disease (Gabriel *et al.* 2015, p. 7, Table 2). Further, predation may be one of the limiting factors in overall population growth for fishers in the SSN DPS. For example, research on effects of mortalities on population growth of fishers in the SSN DPS found that reducing predation by 25 or 50 percent would increase lambda from 0.96 to 1.03 or 1.11, respectively; conversely, removing all mortality sources but predation would only increase lambda to 0.97 (Sweitzer et al 2016a, p. 438). While we did not consider this threat in the 2019 proposed rule, we received peer-reviewed manuscripts during a public comment period providing updated information on mortalities associated with disease and predation. .

Vehicle Collisions

In the SSN DPS, vehicle collisions contributed to 8 percent of documented causes of mortality for fishers (Sweitzer *et al.* 2016a, p. 438). At the northernmost boundary of the SSN DPS, 10 fisher roadkill mortalities have been documented in Yosemite National Park over the past two decades (Service 2016, p. 137). Although many factors affect dispersal and northward population expansion, it is likely that roads and associated traffic in Yosemite National Park combined with other stressors may inhibit northward expansion of the SSN DPS (Spencer *et al.* 2015, p. 21).

<u>Existing Regulatory Mechanisms</u>

U.S. Forest Service (USFS)

The USFS is the landowner for approximately 39 percent of the SSN DPS. A number of Federal agency regulatory mechanisms pertain to management of fisher (and other species and habitat). Most Federal activities must comply with the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 et seq.). NEPA requires Federal agencies to formally document, consider, and publicly disclose the environmental impacts of major Federal actions and management decisions significantly affecting the human environment. NEPA does not regulate or protect fishers, but it requires full evaluation and disclosure of the effects of Federal actions on the environment. Other Federal regulations affecting fishers are the Multiple-Use Sustained Yield Act of 1960, as amended (16 U.S.C. 528 et seq.) and the National Forest Management Act of 1976, as amended (NFMA) (90 Stat. 2949 et seq.; 16 U.S.C. 1601 et seq.).

The NFMA specifies that the USFS must have a land and resource management plan to guide and set standards for all natural-resource-management activities on each National Forest or National Grassland. Additionally, the fisher has been identified as a species of conservation concern by the USFS in the SSN DPS; thus, all Forest Plans within the DPS include Standards and Guidelines designed to benefit fisher. Overall, per USFS guidelines under the NFMA, planning rules must consider the maintenance of viable populations of species of conservation concern.

In 2004 the USFS amended the Forest Plans in the SSN DPS with the Sierra Nevada Forest Plan Amendment (SNFPA; USFS 2004, entire). The SNFPA included measures to increase late-successional forest, retention of important wildlife structures such as large-diameter snags and coarse downed wood, and management of about 40 percent of the plan area as old-forest emphasis areas. The SNFPA also established a 602,100 ha (1,487,800 ac) Southern Sierra Fisher Conservation Area (SSFCA) with additional requirements intended to maintain and expand the fisher population of the southern Sierra Nevada. Conservation measures for the SSFCA includes maintaining a minimum of 50 percent of each watershed in mid-to-late-successional forest (28 cm [11 in] dbh and greater) with forest-canopy closure of 60 percent or more. The plan also includes seasonal protections for known fisher natal and maternal den sites. The USFS is currently updating the NFMPs within the SSN DPS according to the Forest Service 2012 Planning Rule (36 CFR Part 219). A conservation strategy is in progress (described below in SSN Voluntary Conservation Measures) that will provide fisher specific guidance for the updated NFMPs.

National Park Service

The NPS is the land manager for approximately 14 percent of the SSN DPS. Statutory direction for the National Park Service lands within the SSN DPS is provided by provisions of the National Park Service Organic Act of 1916, as amended (54 U.S.C. 100101). Land management plans for the National Parks within California do not contain specific measures to protect fishers, but areas not developed specifically for recreation and camping are managed toward natural processes and species composition and are expected to maintain fisher habitat where it is present.

Rodenticide Regulatory Mechanisms

The threats posed to fishers from the use of rodenticides are described under "Exposure to Toxicants," above. In the 2016 final Species Report (Service 2016, p. 187–189), we analyzed whether existing regulatory mechanisms are able to address the potential threats to fishers posed from both legal and illegal use of rodenticides. As described in the 2016 final Species Report, the use of rodenticides is regulated by several Federal and State mechanisms (e.g., Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended, (FIFRA) 7 U.S.C. 136, et seq.; California Final Regulation Designating Brodifacoum, Bromadiolone, Difenacoum, and Difethialone (Second Generation Anticoagulant Rodenticide Products) as Restricted Materials, California Department of Pesticide Regulation, 2014). The primary regulatory issue for fishers with respect to rodenticides is the availability of large quantities of rodenticides that can be purchased under the guise of legal uses, but are then used illegally in marijuana grows within fisher habitat. Both the Environmental Protection Agency (EPA) and California's Department of Pesticide Regulation developed an effort to reduce the risk posed by the availability of second-generation anticoagulants to end-users, through the 2008 Risk Mitigation Decision for Ten Rodenticides (EPA 2008, entire). This effort issued new n legal requirements for the labeling, packaging, and sale of second-generation anticoagulants, and through a rule effective in July 2014, restricted access to second-generation anticoagulants (California Food and Agricultural Code Section 12978.7).

State Regulatory Mechanisms

California

At the time of the 2014 Proposed Rule, fishers were a Candidate Species in California; thus, take (under the California Endangered Species Act (CESA) definition) was prohibited during the candidacy period. On June 10, 2015, CDFW submitted its status review of the fisher to the CFGC, indicating that listing of the fisher in the Southern Sierra Nevada Evolutionarily Significant Unit (ESU) as threatened was warranted (CDFW 2015, entire). CDFW made their final determination to list the Southern Sierra Nevada ESU as threatened on April 20, 2016 (CFGC2016, p. 10); thus, take continues to be prohibited. It remains illegal to intentionally trap fishers in all of California (Cal. Code Regs. title 14, §460 (2017).

The California Environmental Quality Act (CEQA) can provide protections for a species that meets one of several criteria for rarity (CEQA 15380). Fishers in the SSN DPS meet these criteria, and under CEQA, a lead agency can require that adverse impacts be avoided, minimized, or mitigated for projects subject to CEQA review that may impact fisher habitat. All non-Federal forests in California are governed by the State's Forest Practice Rules (FPR) under the Z'Berg Nejedly Forest Practice Act of 1973, a set of regulations and policies designed to maintain the economic viability of the State's forest products industry while preventing environmental degradation. The FPRs do not contain rules specific to fishers, but they may provide some protection of fisher habitat as a result of timber harvest restrictions.

Voluntary Conservation Mechanisms

There are currently two MOU agreements in California within the range of the SSN DPS for wildfire and fuels management. The first MOU was signed in 2015 by Sierra Forest Legacy, California Department of Forestry and Fire Protection, State of California Sierra Nevada Conservancy, The Wilderness Society, The Nature Conservancy, The Sierra Club, Center for Biological Diversity, USDI National Park Service-Pacific Region, Northern California Prescribed Fire Council, Southern Sierra Prescribed Fire Council, and the USDA, USFS, Pacific Southwest Region. The MOU is titled "Cooperating for the purpose of increasing the use of fire to meet ecological and other management objectives." The purpose of this MOU is to document the cooperation between the parties to increase the use of fire to meet ecological and other management objectives. A second MOU was signed in 2017 by National Fish and Wildlife Foundation, and the USFS, Pacific Southwest Region, Regional Office. The MOU is titled "Pacific Southwest Fuels Management Strategic Investment Partnership." The purpose of this agreement is to document the cooperation between the parties to implement a hazardous-fuels-management program that reduces the risk of severe wildfire, protects ecological values, and reduces the change of damage to public and private improvements. While neither MOU contains specific fisher conservation activities, projects that reduce the likelihood of catastrophic wildfire provide benefit to fisher by reducing habitat loss. Both of these fuel-reduction MOUs provide collaboration between Federal partners and non-governmental partners to organize and fund fuel-reduction projects within the SSN DPS, which could reduce the impact of large-scale high-severity fire. So far, no projects have been funded within the SSN DPS.

The Sierra Nevada Fisher Working Group, which includes CBI, Sierra Nevada Conservancy, USDA USFS, National Park Service, the Service, and California Department of Fish and Wildlife, completed a conservation strategy in 2016 (Spencer *et al.* 2016, entire). The authors of the conservation strategy later released a changed-circumstances letter due to new tree-mortality information (Spencer *et al.* 2017, entire). The changed-circumstances letter provides details on the conservation measures that may no longer be applicable and an interim process for designing and evaluating vegetation-management projects. Current benefits that still exist for fisher from the conservation strategy and the changed-circumstances letter include long-term desired conditions representing a range of characteristics to strive for in various areas to inform fine-scale assessment of key fisher habitat elements, including their connectivity within potential home ranges and across the landscape (Spencer *et al.* 2017, pp. 2–6). A revised/final conservation strategy that addresses the new tree-mortality information is still in progress by the CBI. However, preliminary Draft Interim Recommendations from December 2019 recognize the importance of stabilizing key habitat, restoring landscape permeability, and promoting landscape heterogeneity while offering a suite of suggestions to mitigate potential negative effects of management actions (Thompson *et al.* 2019b, pp. 17–33).

Resiliency, Redundancy, and Representation

In this section, we use the conservation biology principles of resiliency, redundancy, and representation to evaluate how the threats, regulatory mechanisms, and conservation measures identified above relate to the current and future condition of the SSN DPS.

As noted above, the resiliency of species' population(s), and hence an assessment of the species' overall resiliency, can be evaluated by population size and growth rate. While data on these parameters is often not readily available, inferences about resiliency may be drawn from other demographic measures. In the case of the SSN DPS, the population size component of resiliency is lower than historical levels because the total population size is small and fragmented and has been reduced in distribution relative to historical levels. While there is some evidence that the SSN DPS of fishers may have persisted for some time at relatively low numbers, the DPS has recently experienced a 39 percent loss of foraging and denning habitat, a substantial increase in habitat fragmentation, and a 92 percent reduction in habitat patch size following the 2012-2015 drought (Thomspon et al., 2019a pp. 8-9). These negative effects on fisher habitat have likely had additional cascading effects on numbers of individuals through reduction in habitat, potential increases in predator abundance, and decreases connectivity across the range of the DPS.

Threats acting on a species or DPS that cause losses of individuals from a population have the potential to affect the overall resiliency of that population, and should losses occur at a scale large enough that the overall population size and growth rate are negatively impacted, this could reduce the population's ability to withstand stochastic events. The SSN DPS exists at in low numbers across its range and faces a variety of ongoing threats that will result in losses of individual fishers or impede population growth, including continued loss and fragmentation of habitat (i.e., from high-severity wildfire and wildfire-suppression actions, climate change, tree mortality from drought, disease, and insect infestation, vegetation management, and development) and potential direct impacts to individuals (e.g., increased mortality, decreased reproductive rates, increased stress/hormone levels, alterations in behavioral patterns) from wildfire, increased temperatures, increased tree mortality, disease and predation, exposure to toxicants, vehicle collisions, and potential effects associated with small population size. These in conjunction with the small population size of the SSN DPS, the present and ongoing threats cumulatively play a large role in both the current and future resiliency of the DPS. Of greatest importance at this time are:

(1) The long-term suitability of habitat conditions throughout the range of the SSN DPS given the continued presence/extent of high-severity and wide-ranging wildfires and prolonged drought conditions that exacerbate tree mortality from drought, disease, and insect infestation. These conditions: (a) Reduce the availability of the natural resources (e.g., appropriate canopy cover, old-growth forest structure with large trees and snags, patch size) that the species relies on

to complete its essential life-history functions, (b) contribute to increased stress hormones (cortisol) and reduced female fisher survival (as noted in one study in a portion of the SSN DPS), and (c) increase habitat fragmentation within and between populations. The recent 2012-2015 drought and associated tree mortality and wildfire demonstrated that this suite of threats can act rapidly to reduce and fragment fisher habitat across the range of the DPS.

(2) The sustained presence of toxicants from marijuana grow sites across a likely significant proportion of the landscape that contribute to continued fisher mortalities and sublethal effects. Fisher mortalities continue to occur either by direct consumption or sublethal exposure to anticoagulant rodenticides, the latter of which may increase fisher death rates from other impacts such as predation, disease, or intraspecific conflict. In a small population, such as the SSN DPS of fisher, the lethal and sublethal effects of toxicants on individuals have greater potential to reduce the resiliency of the population.

(3) Continued fragmentation of habitat in conjunction with the isolation and potential inbreeding of the SSN DPS, especially when taking into account the threats of toxicant exposure and habitat losses. These ongoing threats increase this DPS's vulnerability to extinction from stochastic events particularly as fragmentation continues to reduce habitat patch size and limit connectivity across the landscape. Regardless of this DPS's potential for growth into the small amount of available but unoccupied suitable habitat present, we do anticipate this DPS will be small into the long-term future and is at risk of future reductions in population size due to continued habitat loss from drought, wildfire, and tree mortality into the future (see also Service 2016, p. 133–137). Comments on the 2014 Proposed Rule and 2019 Revised Proposed Rule received to date generally agree that the SSN DPS is small.

The SSN DPS of fisher has maintained its presence across its current range despite the degree of habitat loss and fragmentation from prolonged drought conditions and wildfire impacts, coupled with mortalities from toxicants (both anticoagulant and neurotoxicant rodenticides), and at least some reduced female survival associated with increased stress hormones and reduced habitat suitability documented in a portion of the SSN DPS (see "Tree Mortality from Drought, Disease, and Insect Infestation" above). However, the long-term demographic effects of the large-scale loss of habitat and increase in habitat fragmentation following the 2012-2015 drought are not yet understood. Historical reductions in range in combination with recent range-wide habitat loss and fragmentation along with other ongoing threats such as exposure to toxicants indicate that the current resiliency of the SSN DPS of fishers may be quite low. The best available science and information at this time indicate that the current resiliency of the SSN DPS of fisher is low and it is likely that resiliency of this DPS will decrease further in the near-term future. This conclusion is based on the 39 percent loss of foraging and denning habitat along with 92% decrease in habitat patch size that has occurred across the range of the SSN DPS of fisher in the past five years and likelihood that the threats that caused these declines will continue to operate across the range of the SSN DPS. The current and ongoing cumulative impacts to the SSN DPS associated with current climate-change-model predictions for continued periodic but prolonged drought conditions, predictions of continued and increased intensity of wildfires and subsequent habitat loss and fragmentation in the southern Sierra Nevada, the high likelihood of continued presence and spread of forest insect and tree diseases, and the low likelihood that a significant proportion of existing toxicants on the landscape would be removed in the near-term future indicate that the range of SSN DPS is likely to decrease in available habitat and habitat patch size along with continued exposure to threats to individual survival resulting in continued declines in resiliency.

With regard to redundancy, multiple, interacting populations across a broad geographic area or a single wide-ranging population (redundancy) provide insurance against the risk of extinction caused by catastrophic events. Prior to the 2012-2015 drought, redundancy was limited across the range of the SSN DPS as a result of the DPS being a single fragmented population distributed over a relatively confined (for a carnivorous mammal) geographic area. Redundancy was further limited by the range-wide loss of foraging and denning habitat along with the associate increase in habitat fragmentation and decrease in habitat patch size which make the species as a whole more susceptible to catastrophic events by further limiting their distribution. The limited redundancy of the SSN DPS decreases the DPS's chance of survival in the face of potential environmental, demographic, and genetic stochastic factors and catastrophic events (extreme drought, wildfire, Allee effects, etc.).

Lastly, we consider the current representation across the SSN DPS of fisher to be limited, considering the DPS's existence as only a single fragmented population with low genetic diversity. The SSN DPS exists in a limited range of environmental conditions and has narrow representation in the environments that it occupies. An additional concern for current and future representation in the SSN DPS of fisher is that fragmented populations can be more susceptible to local declines, contributing further to loss of genetic diversity. As future droughts, wildfire, and tree mortality continue to fragment remaining fisher habitat the opportunity for loss of genetic diversity may increase because of limited connectivity among habitat patches. Overall, SSN DPS fishers are represented across a small, fragmented range and occur in small numbers.

Determination

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 "endangered species" or "threatened species." The Act defines an "endangered species" as a species that is "in danger of extinction throughout all or a significant portion of its range," and a "threatened species" as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether a species meets the definition of "endangered species" or "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

In our 2019 Revised Proposed Rule we proposed that the Western DPS of fisher met the definition of a threatened species. Recognizing the SSN as a separate DPS, we now conduct an analysis of the SSN DPS to determine its status considering current condition of the DPS and current on ongoing threats We evaluated threats to the SSN DPS of fishers and assessed the cumulative effect of the threats under the section 4(a)(1) factors. Our 2016 Species Report (Service 2016, entire) is the most recent detailed compilation of fisher ecology and life history, and it has a significant amount of analysis related to the potential impacts of threats within the SSN DPS's range. In addition, we collected and evaluated new information available since

2016, including new information made available to us during the recent comment periods in 2019, to ensure a thorough analysis, as discussed above. Our analysis as reflected in this rule included our reassessment of the previous information and comments received on the 2014 Proposed Rule regarding the potential impacts to the SSN DPS of fisher, as well as our consideration of new information regarding the past, present, and future threats to the DPS, and the comments and information received during the two comment periods associated with the 2019 Revised Proposed Rule.

We find that the SSN DPS is currently in danger of extinction throughout all of its range due to the existing threats that have resulted in a small population size, reduced geographic distribution, and reduced habitat quality resulting in habitat fragmentation. Because it is limited to a single, fragmented population with few individuals, has experienced recent and rapid loss of habitat, and given the threats acting upon it, the current condition of the SSN DPS across the southern Sierra Nevada does not demonstrate resiliency, redundancy, and representation such that persistence into the future is likely.

At this time, the best available information suggests that future resiliency for the SSN DPS of fisher is low. As discussed above in the "Risk Factors for the SSN DPS of Fisher" section (along with some detail in the 2014 draft and 2016 final Species Reports (Service 2014 and 2016, entire)), the SSN DPS faces a variety of threats including: loss and fragmentation of habitat resulting from high-severity wildfire and wildfire suppression, climate change, tree mortality from drought, disease, and insect infestations, vegetation management, and development; and potential direct impacts to individuals (e.g., increased mortality, decreased reproductive rates, increased stress/hormone levels, alterations in behavioral patterns) from wildfire, increased temperatures, increased tree mortality, disease and predation, exposure to toxicants, vehicle collisions, and potential effects associated with small population size.

Currently, fishers in the SSN DPS exist in one small population. Estimates of population size and trend prior to the severe 2012-2015 drought suggested the SSN DPS consisted of approximately 300 individuals (range = low of 100 to a high of 500 individuals), while there is no statistically detectable trend in population size or growth. No estimates are available for population size or trend following the 39% loss of foraging and denning habitat and 92% reduction in average habitat patch size. Overall, the SSN DPS of fisher exists as a single small population that has persisted but does not appear to be expanding and has experienced recent substantial habitat loss, fragmentation, and reduction in habitat patch size.

We took into consideration all of the threats operating within the range of SSN DPS. This DPS is reduced in size due to historical trapping and past loss of late-successional habitat and, therefore, is more vulnerable to extinction from random events and increases in mortality. Some examples of multiple threats on the SSN DPS of fisher include:

- destruction, modification, or curtailment of habitat, which may increase fisher's vulnerability to predation and loss of genetic diversity (Factors A, C, and E);
- impacts associated with climate change, such as increased risk of wildfire and tree mortality (tree insects and disease) (Factors A, C, and E)

Depending on the scope and degree of each of the threats and how they combine cumulatively, these threats can be of particular concern where populations are small and isolated. The cumulative effect (all threats combined) is currently causing rapid loss of habitat and habitat patch size across the range of the SSN DPS and exposing SSN DPS fishers to increased threats from direct mortality resulting in low resiliency and reducing viability for the SSN DPS as a whole. The SSN DPS is particularly vulnerable in areas not managed for retention and recruitment of fisher habitat attributes, areas sensitive to climate change, areas susceptible to large high-severity fires and tree mortality, and areas where direct mortality of fishers reduces their ability to maintain or expand their populations (Service 2014, p. 166–169). Additionally, although there is currently a wide array of regulatory mechanisms and voluntary conservation measures in place to provide some benefits to the species and its habitat (see "Existing Regulatory Mechanisms" and "Voluntary Conservation Measures," above), these measures have not ameliorated the threats to such a degree that the DPS is not currently in danger of extinction. In particular threats acting on this small population related to illegal rodenticide use, increasing high-severity wildfires, and prolonged droughts that exacerbate the effects from wildfire, forest insects, and tree disease are operating at a scale much larger than the current scope of the beneficial actions. Further, the two MOU agreements in California within the range of the SSN DPS for wildfire and fuels management have no specific conservation measures for fisher.

The best available information suggests that identified threats are of concern across the range of the SSN DPS because of the narrow band of habitat that comprises this DPS and its vulnerability to negative impacts associated with small population size. As noted in our analysis, preliminary habitat-based population models suggest that the configuration of habitat affects population numbers in this region, and that some areas with high-quality habitat may remain unoccupied even at equilibrium population sizes, probably due to restricted connectivity between these locations and the main body of the population (Service 2016, p. 44; Rustigian-Romsos 2013, pers. comm.). Therefore, the cumulative impacts related to the habitat-based threats are likely to have a negative effect on the SSN DPS because connectivity would likely decrease further (Service 2016, p. 69).

For the mortality-related threats, we reaffirm our quantitative assessment from 2014 regarding potential cumulative impacts in those portions of the range of the SSN DPS where data were available to do so. Modeling completed for the SSN DPS demonstrates that a 10 to 20 percent increase in mortality rates could prevent fisher populations from the opportunity to expand in the future (Spencer *et al.* 2011, p. 10–12). Coupled with an increasing trend in habitat-related threats, the best available information suggests that cumulative effects to the SSN DPS of fisher are reducing its resiliency to such a degree that the DPS is currently in danger of extinction throughout all of its range. Based on our review of the best scientific and commercial data available, we have determined the SSN DPS of fisher meets the definition of an endangered species under the Act. Per our 2014 draft and 2016 final Species Reports, as well as our most recent analysis summarized herein and based on the comments and information received on the 2019 Revised Proposed Rule, we find the cumulative impact of all identified threats on the SSN DPS, especially habitat loss and fragmentation due to high-severity wildfire (Factor A) and vegetation management (Factor A) (noting that tree mortality from drought, disease, and insect infestation is exacerbated by changing climate conditions and thus also play a role under Factor A), and exposure to toxicants (Factor E), are acting upon the SSN DPS to such a degree that it is currently in danger of extinction. The existing regulatory mechanisms (Factor D) are not addressing these threats to the level that the species does not meet the definition of an endangered species.

Thus, after assessing the best available information, we conclude that the SSN DPS of fisher is currently in danger of extinction throughout all of its range. In reaching this conclusion, we have considered all information received from species experts, partners, the public, and other interested parties, including the variety of available conservation measures and existing regulatory mechanisms that may ameliorate the threats.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. We have determined that the SSN 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 we have determined that the SSN DPS warrants listing as endangered throughout all of its range, our determination is consistent with the decision in *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020), in which the court vacated the aspect of the 2014 Significant Portion of its Range Policy that provided the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range.

Determination of Status

Our review of the best available scientific and commercial information indicates that the SSN DPS of fisher meets the definition of an endangered species. Therefore, we are listing the SSN DPS of fisher 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, 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 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. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery-planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. 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.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review when a species may be ready for downlisting or 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. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (http://www.fws.gov/endangered), or from our Yreka 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 (for example, 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.

Following publication of this final listing rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of California would be eligible for Federal funds to implement management actions that promote the protection or recovery of the SSN DPS of fisher. Information on our grant programs that are available to aid species recovery can be found at: http://www.fws.gov/grants.

Please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species 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 must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities as well as toxicant use on Federal lands administered by the U.S. Fish and Wildlife Service, USFS, BLM, and National Park Service; issuance of section 404

Clean Water Act permits by the Army Corps of Engineers; and construction and maintenance of roads or highways by the Federal Highway Administration.

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. There are also certain statutory 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. Based on the best available information, the following actions are unlikely to result in a violation of section 9, 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 SSN DPS of fisher 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, or an approved conservation agreement.

Critical Habitat

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. In the revised proposed listing rule (84 FR 60278; November 7, 2019), we determined that designation of critical habitat was prudent but not determinable because specific information needed to analyze the impacts of designation was lacking. We are still in the process of assessing this information. We plan to publish a proposed rule to designate critical habitat for the SSN DPS of fisher in the near future.

Summary of Comments and Recommendations

In the 2014 Proposed Rule published on October 7, 2014 (79 FR 60419; Docket No. FWS–R8–ES–2014–0041), we requested that all interested parties submit written comments on the proposal by January 5, 2015. We electively held one public hearing and seven public information meetings between November 13 and December 4, 2014. The comment period for this rule was extended (79 FR 76950; December 23, 2014) and reopened (80 FR 19953; April 14, 2015) for additional comments. Following our withdrawal of this proposed rule (81 FR 22710; April 18, 2016) and subsequent litigation (see Previous Federal Actions, above), the District Court for the Northern District of California reinstated the 2014 Proposed Rule on September 21, 2018. Given the time that had elapsed and the availability of new information, we reopened the comment period on the 2014 Proposed Rule on January 31, 2019 (84 FR 645), requesting that all interested parties submit new information or comments by March 4, 2019. We published the 2019 Revised Proposed Rule on November 7, 2019 (84 FR 60278), again requesting that all interested parties submit written comments on the proposal by December 9, 2019, and noting that all previously submitted comments would be fully considered in the preparation of our final determination. Finally, we reopened the comment period on the 2019 Revised Proposed rule for additional comments and information to be submitted by January 3, 2020 (84 FR 69712; December 19, 2019), reiterating that our final determination would take into consideration all comments and any additional information we have received during the comment periods described herein.

Notices were published in a variety of newspapers during the comment periods inviting general public comment on the various announcements between 2014 and 2019 outlined above. Newspaper notices covered the range of the DPS and included one or more of the following:

Bellingham World, Chico Enterprise Record, Eureka Times-Standard, Fresno Bee, Klamath Falls Herald and News, Olympian, Oregonian, Peninsula Daily News, Redding Record Searchlight, Sacramento Bee, Wenatchee World, and Yakima Herald Republic. We also contacted appropriate Federal and State agencies, Tribes, scientific experts and organizations, and other interested parties and invited them to comment on both the 2014 Draft Species Report and the 2014 Proposed Rule. Information received from these parties was used to update the 2016 Species Report and the 2019 Revised Proposed Rule. We also used information received from Federal and State agencies, Tribes, organizations, and other partners throughout the process. All substantive information provided during the comment periods outlined above has either been incorporated directly into this final determination or addressed below.

In connection with development of this final rule, we reviewed comments received from the public and peer reviewers on the 2014 Proposed Rule and the Draft Species Report, and from the public on the 2019 Revised Proposed Rule. As outlined in the April 2016 Withdrawal (81 FR 22709), which provides our full response to all comments received to the initial documents, we added new information, made clarifications, and made necessary corrections to our Final Species Report (Service 2016, entire) to reflect the peer and public comments received to that time. As necessary, these prior comments have been reevaluated to inform the development of this final rule. For those comments where we determined a further response was required, they are addressed in our response to comments section below or are incorporated in our analysis in the specific section of the final rule as appropriate.

4(d) Rule

(1) Comment: Multiple commenters raised concerns, provided suggestions, and asked for clarification on the 4(d) rule in the 2019 Revised Proposed Rule.

Our Response: Under section 4(d) of the Act, the Secretary of the Interior has the discretion to issue such regulations as he deems necessary and advisable to provide for the conservation of a species listed as threatened, and can by regulation prohibit with respect to such species any act prohibited under section 9(a)(1) for threatened wildlife species. In this final rule, we determine that the NCSO DPS does not warrant listing under the Act and that the SSN DPS meets the definition of an endangered species under the Act; therefore, since neither DPS will be listed as threatened, the section 4(d) provisions do not apply and the proposed 4(d) rule has been removed from this final rule.

Climate Change

(2) Comment: One commenter asserted that voluntary conservation efforts on non-Federal lands mitigate and decrease the threats of climate change to fisher.

Our Response: We considered both regulatory and voluntary conservation measures that are currently being implemented to reduce the impacts of the stressors to the species in the final Species Report (Service 2016, pp. 162–189) and updated in this document (see Existing Regulatory Mechanisms and Voluntary Conservation Measures, above), including important voluntary conservation contributions on non-Federal lands.

We found that listing of the NCSO DPS was not warranted. We have found that the SSN DPS meets the definition of an endangered species. At this time, we continue to assert that fisher habitat is likely to be affected by changing climate conditions, but the severity will vary, potentially greatly, between the NCSO DPS and the SSN DPS, with effects to fishers ranging from negative, neutral, or potentially beneficial. We cannot at this time conclude that conservation efforts on non-Federal lands are mitigating or decreasing the threats of climate change to fisher within the NCSO DPS or the SSN DPS. That said, voluntary actions on non-Federal lands, particularly within the NCSO DPS, provide a conservation benefit to the species (e.g., actions that reduce significant spread of high severity wildfires) and may contribute to reducing the overall cumulative impacts to the NCSO DPS and its habitat. Overall, anything that reduces impacts to the species in the future would help increase its resilience to climate change

(3) Comment: One commenter claimed that the best available science on climate change should be added to our analysis, including recent modeling and analysis information related to warming climate, wildfire severity, and droughts. This comment also was raised in comments received on the 2014 Proposed Rule stating that there are conflicting perspectives on the potential impacts associated with changing climate conditions, and the Service needs to evaluate the best available information.

Our Response: We have evaluated new information on climate change that has become available since the 2014 Proposed Rule, including literature received and suggested citations during the comment periods on the 2019 Revised Proposed Rule. All information received has been reviewed and analyzed as part of our determination; the information is included in the decision record for this determination, but not necessarily cited in this rule. Significant new information or updates are included in the Climate Change sections above.

Completeness and Accuracy

(4) Comment: Several commenters stated that the 30-day comment period for the 2019 Revised Proposed Rule did not provide the public enough time to evaluate the changes made to the proposed rule, which had significant differences from our previous determinations.

Our Response: In response to multiple requests seeking more time to fully evaluate the information in the 2019 Revised Proposed Rule, we added an additional 15-day comment period (ending on January 3, 2020) to the original 30-day comment period for the 2019 Revised Proposed Rule. Moreover, as noted in our discussion of the DPS above, we provided the public with notice of two alternative DPS configurations in our 2014 Proposed Rule, which included DPS boundaries that are very similar to the DPS configurations that were analyzed in the 2019 Revised Proposed Rule and this final determination.

(5) Comment: One commenter mentioned that significant new information has been developed since the completion of the 2016 final Species Report, and that the 2019 Revised Proposed Rule mentioned some of the new data. However, the commenter stated that the Service did not clarify how much weight was given to the new information in the decision to propose listing the fisher.

Our Response: New information became available between completion of the 2016 final Species Report and the 2019 Revised Proposed Rule to list the fisher as a threatened species, and new information became available since the publication of our 2019 Revised Proposed Rule. We are obligated under the Act to carefully consider whether or not any new information would affect our decision to list a species (i.e., meeting the definition of an endangered or a threatened species according to section 3 of the Act). All new information provided since the 2016 final Species Report was carefully analyzed. We found that the new information and information submitted during public comment provided substantial evidence that threats to the fisher have been reduced or eliminated to the extent that listing of the fisher is not warranted in the NCSO but is warranted for listing as an endangered species in the SSN DPS.

Critical Habitat

(6) Comment: Many commenters articulated the need for designated critical habitat for the West Coast DPS of fisher. Two of these commenters asserted that critical habitat should have been proposed concurrent with the proposed listing rule.

Our Response: We stated in the 2019 Revised Proposed Rule that we were in the process of working with the States and other partners in acquiring the complex information needed to perform an economic analysis. As stated in **II. Critical Habitat**, above, we are still assessing information and we anticipate publishing a proposed rule to designate critical habitat in the near future.

Current Conservation Agreements

(7) Comment: One commenter asked if landowners will be able to enroll in CCAAs after a final rule is published.

Our Response: Landowners within the area of the NCSO DPS can enroll in CCAAs because we found that listing of the NCSO DPS was not warranted. Once a species is listed as threatened or endangered under the Act, landowners are not able to enroll in CCAAs for that species; this applies to the SSN DPS. However, other conservation tools such as Safe Harbor Agreements (SHA) can provide assurances for landowners. An SHA is a voluntary agreement between the Service and private or other non-Federal property owners whose actions contribute to the recovery of federally listed species. Landowners who fulfill the conditions of the SHA will not be subject to any additional or different management activities without their consent.

(8) Comment: One commenter stated that the completion of a marten/fisher conservation strategy would complement work being done by the Forest Service. A second commenter provided a summary of a draft conservation strategy for fisher in the SSN subpopulation, claiming that the strategy will update fisher and fisher habitat status, summarize new science, provide recommendations for identifying and maintaining key habitat elements, provide recommendations for increasing resilience of fisher habitat, identify potential mitigation for necessary management (e.g., hazard tree removal), and identify potential management options for forest conditions that support fisher conservation.

Our Response: The Service supports a conservation strategy for the benefit of marten and fisher to complement work being done by the Forest Service. The new draft conservation strategy for fisher in the SSN DPS was reviewed and discussed in the SSN Final Rule under "Current Condition" and "Voluntary Conservation Measures."

(9) Comment: One commenter stated the 2019 Revised Proposed Rule was unclear as to whether or not conservation measures currently being implemented for fisher were evaluated. Therefore,

the commenter advised that the Service cannot rely on those measures to support conclusions for unregulated take of individuals on federal land.

Our Response: The Service evaluates voluntary conservation measures when considering the status of a species under section 4 of the Act. As such, voluntary conservation measures were considered in this final rule for fisher. See the Voluntary Conservation Measures section above.

(10) Comment: One commenter stated that sustainable forestry practices on private land support fisher conservation by providing healthy forests, forest products, and wildlife enhancements. The commenter claimed that unnecessary regulations and restrictions of sustainable forestry practices will negatively affect fisher populations and the ability of private land owners to maintain working forests on their lands.

Our Response: We appreciate the efforts on private lands to support healthy forests and provide wildlife enhancements that benefit fisher, and we will continue to work with landowners. We assume the commenter is concerned that sustainable forestry practices would be regulated as a result of listing the fisher under the Act. We found that listing of the NCSO DPS was not warranted. We determined that the SSN DPS meets the definition of endangered; thus, we are required by the Act to list it. The Service will work with partners to continue forest practices that retain key elements of fisher habitat that will continue to contribute to the overall conservation of the species.

(11) Comment: Multiple commenters stated that voluntary conservation measures and multi-entity partnerships are in place, should receive Federal support or funding assistance, and should

be the focus of the evaluation of the status of the fisher. Specifically, the commenters claimed that Federal and non-Federal land managers are engaging in collaborative efforts (e.g., CCAAs, HCPs, MOUs) to maintain fisher habitat and minimize wildfire risk, and the Service failed to acknowledge these efforts and their contribution to fisher conservation. Some of these commenters also stated that the Service provided little justification to the determination that conservation agreements are not acting at a scale and magnitude sufficient to ameliorate threats, and that the extent of the agreements was not considered. An additional commenter is similarly concerned that listing the fisher would mandate section 7 consultation under the Act for actions implemented under MOUs, which would hinder implementation and increase the risk of catastrophic wildfire. Finally, another commenter suggested that CCAAs, which cover several million acres, are being implemented or are sufficiently certain to be implemented, which should compel the Service to withdraw the proposed listing rule.

Our Response: The Service supports conservation efforts for the benefit of fisher in both the NCSO DPS and the SSN DPS. We incorporated additional information that was received during the comment period into our analysis including Candidate Conservation Agreement with Assurances, Habitat Conservation Plans, and Memorandums of Understanding that benefit the NCSO DPS and/or the SSN DPS of fisher. We found that listing of the NCSO DPS was not warranted. We have found that the SSN DPS meets the definition of endangered; therefore, it is necessary to carefully assess actions that may impact the DPS to avoid extinction. The Service will work with partners to continue forest practices that retain key elements of fisher habitat that will continue to contribute to the overall conservation of the species. See also the response to *Comment 10* above.

(12) Comment: One commenter stated that the Service did not apply the PECE policy and asserted that application of this policy will result in a determination that listing fisher as a threatened species is not necessary.

Our Response: In this final rule, the listable entities are two DPSs, the NCSO DPS and the SSN DPS. The NCSO DPS is not warranted for listing, so a PECE analysis is not appropriate. The SSN DPS is warranted for listing as an endangered species, and we conclude that the existing conservation efforts are not to the level that prevents the SSN DPS from meeting the Act's definition of an endangered species.

(13) Comment: One commenter is concerned that timber management at a landscape scale is likely to be unaffected by listing fisher. Specifically, the commenter asserted that agreements with timber companies that exempt timber management activities will not provide landscape scale contiguous tracts of habitat or sufficient trees with cavities.

Our Response: We assume the agreements the commenter refers to are HCPs, CCAAs, and SHAs. Each HCP, CCAA, and SHA contains measures to protect habitats for listed species. While these may not individually operate at a landscape scale, the combined efforts across the range of the species contribute to the ability of fishers to move across larger landscapes and to find trees for denning and resting.

Distinct Population Segment (DPS)

(14) Comment: Several commenters believed there should be more than one DPS (with separate listing decisions) in the area described in the 2019 Revised Proposed Rule as the West Coast

DPS of fisher. Some commenters stated that the NCSO and SSN subpopulations are two separate/isolated geographic areas with no genetic interchange, and therefore they should be two separate DPSs, especially given the apparent differences in landscape-level threats and information that they believe qualifies the SSN as distinct and significant according to our DPS Policy. Some of these commenters further articulated that the DPSs should be consistent with the ESUs designated in 2015 by the California Department of Fish and Wildlife, including that we should consider their decision that listing the Northern California ESU was not warranted. Two commenters asserted that the SSN subpopulation should be a DPS that is listed as endangered and the NCSO subpopulation should be a DPS that is listed as threatened given the differences in existing conditions and threats into the future. Finally, another commenter asserted that the NCSO, SSN, NSN, and SOC subpopulations should all be individual DPSs.

Our Response: We received multiple comments on our DPS approach in both the 2014 Proposed Rule and 2019 Revised Proposed Rule. As explained in further detail in this document's Summary of Changes from the 2019 Revised Proposed Rule section, we carefully considered all these comments, and as a result re-evaluated our DPS approach. We determined that what we had proposed as the West Coast DPS in the 2019 Revised Proposed Rule should instead be two separate DPSs, one for the SSN subpopulation, and one for the several subpopulations comprising the NCSO geographic area. We determined our analysis would focus on the conservation of extant subpopulations historically indigenous to the California and southern Oregon region with unique genetic characteristics (as outlined in the 2014 Proposed Rule), while also allowing for separate management of the two DPSs if either or both were warranted for listing. For a complete discussion of the logical outgrowth that led to this outcome, please refer to the Summary of Changes section mentioned above, as well as the detailed Distinct Population Segment analyses presented herein.

(15) Comment: One commenter agreed that the DPS configuration should not include the State of Washington, and two commenters disagreed, requesting that we reconsider and include this area to address the connectivity needs of the species and consideration of habitat needed for dispersal. One of the two commenters that disagreed also suggested that population monitoring of recent fisher reintroductions in Washington would be more readily supported if this area was included in the DPS configuration. Relatedly, we also received multiple comments on the 2014 Proposed Rule suggesting that the Service needs to consider connectivity between subpopulations and dispersal habitat within the DPS configuration, including habitat in Washington and Oregon that is north of the current distribution.

Our Response: As explained in further detail in both the 2019 Revised Proposed Rule, and in this document's Distinct Population Segment analyses, the determination of a DPS is based on where a population segment actually occurs on the landscape. A DPS does not set a geographic boundary, nor "set aside" connectivity or dispersal habitat for conservation purposes, but rather identifies the segment of a population that is discrete from, and significant to the taxon as a whole, and that may or may not require protection under the Act. Our DPS approach focused on the extant subpopulations historically indigenous to the California and southern Oregon region with unique genetic characteristics, and such subpopulations do not occur in Washington, nor in Oregon north of the current distribution.

(16) Comment: One commenter asserted that it is inappropriate to consider fishers reintroduced in the State of Washington as nonnative, as this typically describes taxons occurring outside their historical range. The commenter stated that reintroduced fishers in Washington are from source populations in British Columbia and Alberta, which were likely contiguous and interbreeding with fishers that historically occurred in Washington.

Our Response: In both the 2014 Proposed Rule and 2019 Revised Proposed Rule, we explained that our use of the term "nonnative," was intended to articulate the difference between the extant fisher subpopulations that have been indigenous to the three west coast states since the before the time of the original petition ("native"), and those current fisher subpopulations that were established with fishers from outside the three west coast states ("nonnative"). We recognize that the fisher populations currently established in Washington are genetically similar to historically indigenous Washington fishers, prior to their extirpation, and our only purpose in the use of the term "nonnative" was to distinguish the reintroduced Washington fishers from those fishers in California and northern Oregon that are historically extant.

(17) Comment: One commenter stated that the revised DPS delineation/description limits opportunities to implement future conservation measures throughout the historical range of the species. They also stated that excluding historically occupied fisher habitat in Washington and Oregon limits opportunities for recovery.

Our Response: Please see our response to *Comment 15*. Conservation measures are not limited throughout the range of the species by this listing determination.

(18) Comment: Several commenters requested that we clearly define the boundary of the DPS. For example, one commenter stated that there are only dispersing fishers in one area within the delineated boundary as described in the 2019 Revised Proposed Rule, and there does not appear to be a breeding population there. Two commenters suggested that specific extant subpopulations are delineated that include a predicted movement distance, such as the approach used for the Humboldt marten. Two other commenters stated that the proposed boundary does not represent the extant subpopulations or the specific predicted habitat areas, noting their belief that the basis for the current depiction is unclear.

Our Response: Please see our responses to *Comment 14* and *Comment 15* regarding the final determination of DPSs. Additionally, there is no requirement that all areas of a DPS be used for breeding. And, when we identify a DPS, we are simultaneously evaluating the current range of the animals comprising the DPS. This is identical to our process for any listed species. Any maps accompanying these determinations are intended to illustrate that range, based on the best available scientific and commercial information regarding the species' (or DPS's) ecology and the availability of its resource needs on the landscape but does not represent a determination by the Service that all areas within a generalize range are occupied by the species. The maps presented herein depict our understanding of the current ranges of both DPSs, with the further understanding that these ranges are not necessarily static, and individuals from either DPS have the potential to expand or contract from what are the current range limits.

(19) Comment: One Federal partner stated their support of listing native fisher populations wherever they occur, but suggested the area east of Highway 97 in Oregon be excluded.

Our Response: As presented herein, our final analysis determines that the NCSO DPS, which included fishers in Oregon, does not meet the definition of either a threatened or endangered species. As a result, fishers east of Highway 97 would not be considered listed under the Act.

(20) Comment: One commenter asserted that fishers residing in the SOC subpopulation (reintroduced from British Columbia and Minnesota) experience significantly different threats and existing conditions (e.g., small population size, surrounding habitat for expansion) than the NCSO subpopulation; therefore, these factors should lead to not including this subpopulation area in any DPS.

Our Response: As presented herein, our final analysis includes the SOC subpopulation within the NCSO DPS. Although the SOC subpopulation was established with fishers from British Columbia and Minnesota, the area where the SOC occurs lies within the historical range of the NCSO DPS, and more importantly, includes documentation of SOC fishers interbreeding with fishers of the NCSO subpopulation (Pilgrim and Schwartz 2016, entire; Pilgrim and Schwartz 2017, entire). Given this interbreeding activity and the use of suitable habitat between these two population areas, it was a sound and logical conclusion to include all fishers across these areas as part of the NCSO subpopulation. However, we found that listing of the NCSO DPS was not warranted.

Distribution

(21) Comment: One commenter provided new fisher detection locations from systematic camera surveys conducted from October 2018 to February 2019 and from October 2019 through

December 2019 within their private timberlands in coastal northern California. The commenter asserts that the new information indicates that fishers remain well distributed across their coastal California timberlands and that fishers may have expanded into portions of northern coastal California where they were not detected during earlier survey efforts.

Our Response: We thank the commenter for the new fisher detection information, which augments our knowledge of the distribution and relative abundance of the fisher within the NCSO. We have included this information in the NCSO Current Condition above. We agree that the submitted information demonstrates that fishers are well distributed across portions of the commenter's California timberlands where surveys were conducted.

(22) Comment: One commenter disagreed with information we presented in the 2019 Revised Proposed Rule regarding the historical and current distribution of fishers in the SSN subpopulation. The commenter suggested that our statement that historically the SSN subpopulation likely extended farther north than our current DPS boundary in the Sierra Nevada was conjecture and that historical museum specimens are limited to south of the Tuolumne River, which is currently the northern boundary of what was identified in the 2019 Revised Proposed Rule as the Sierra Nevada portion of the DPS. Further, the commenter mentioned that our statement that multiple lines of genetic evidence suggests that the NCSO and SSN subpopulations have been isolated since before European settlement contradicts the previous assertion that fishers historically occupied the area between the NCSO and SSN portions of the DPS. The commenter also disagreed with our statement that the current northern boundary of the SSN subpopulation is the Tuolumne River in Yosemite National Park, asserting that the northern

extent of the current occupied distribution of the SSN subpopulation is actually the Merced River, varying from about 10 to 20 miles south of the Tuolomne River. They stated that only a single male fisher was recently detected north of the Merced River and that there is no fisher population between the Merced and Tuolomne rivers.

Our Response: Although not confirmed, there are numerous historical sightings of fishers, many of them from reported trapping locations from 1919-1924, in the areas between the SSN and NCSO DPSs (summarized in CDFW 2015, pp. 17-19). Thus, we conclude that at some point, fishers occupied portions of the northern Sierra Nevada at least temporarily. Whether the northern Sierra Nevada contained a viable population or only served as a movement corridor between the current NCSO and SSN DPSs is unknown. That said, genetic information supports that the NCSO and SSN DPSs have been largely separated for thousands of years (Tucker *et al.* 2014, p. 3), so we determined that separating the NCSO DPS and SSN DPS was appropriate.

We included the area between the Tuolomne and Merced Rivers in the SSN DPS because the area contains suitable habitat, and fishers found in this area would be a part of the SSN DPS. In addition, the recent detection of at least one fisher north of the Merced River indicates that the SSN DPS has the capability to expand into the area between the Tuolomne River and the Merced River (Stock 2020, pers. comm.).

Existing Regulatory Mechanisms

(23) Comment: Several commenters stated that the proposed rule fails to adequately consider existing conservation efforts that benefit the fisher and other actions that benefit other forest

species. These efforts include such things as CCAAs, MOUs, HCPs, ongoing enforcement agreements implemented by State and Federal parties, and conservation agreements for other species such as spotted owls, which can benefit fisher. Although many of these efforts are mentioned in the 2019 Revised Proposed Rule, the commenters believed that there is no evaluation, both individually and cumulatively. Other commenters stated that these efforts must be considered in combination with the extensive regulatory framework that already exists (e.g., the Sierra Nevada Forest Plan Amendment for the Forest Service; the California Forest Practice Rules and the California Environmental Quality Act and their roles in the timber harvest planning process in the state).

Our Response: As noted by the commenter, our 2019 Revised Proposed Rule mentions existing conservation efforts that provide benefits to fisher and other forest species. In that proposed rule, we provided an in-depth discussion about how existing regulatory mechanisms and other voluntary conservation efforts benefit fishers. Each of these regulatory mechanisms and conservation efforts were evaluated individually for how they may provide benefits, and cumulatively to assess how in combination they may ameliorate threats. A similar in-depth analysis is provided in this current rule, albeit with analyses specific to both the NCSO DPS and SSN DPS. Further discussion of how all of the regulatory mechanisms and conservation efforts were considered in the context of the existing regulatory frameworks and our status evaluations can be found in the Determination sections for each DPS in this final rule document.

(24) Comment: One commenter stated that the proposed rule does not consider the widespread participation in sustainable forest management certification programs such as the Sustainable

Forestry Initiative and the Forest Stewardship Council that promote forest health and resilience in opposition to climate change with sequestration of carbon in wood products and renewable reforestation and harvest cycles.

Our Response: While sustainable forest management certification programs require actions by participants that are ecologically beneficial, the certification standards are too general to evaluate the effects of participation on fisher conservation. As an example, one of the certification programs lists the following standards: 1) a program to protect threatened and endangered species; 2) a program to locate and protect known sites of flora and fauna associated with viable occurrences of critically imperiled and imperiled species and communities also known as Forests with Exceptional Conservation Value; 3) and support of and participation in plans or programs for the conservation of old-growth forests in the region of ownership or forest tenure." (SFI 2015, p. 6). We believe these sustainable forest management certification programs can and do promote and lead to fisher conservation. We are not implying that these standards are faulty. However, as written these general standards are too vague to consider their benefit to fishers and how they may reduce existing threats. The Service requires specific information from the participants of the sustainable forest management certification program and how they meet these standards in order to be able to assess the degree to which they affect fisher conservation and address the threats to the species.

(25) Comment: One commenter stated that the Service cannot rationally assume that BLM lands in the DPS will be managed in a way to promote viability or recovery of fisher because of recent court rulings regarding the Oregon and California Railroad (O&C) lands under BLM

management. If these rulings stand, BLM will no longer be able to place O&C timberlands in reserves. The final rule must address how the Service intends to achieve recovery in light of these rulings.

Our Response: We have acknowledged the recent court ruling regarding BLM O&C lands in this rule and that this decision has been appealed. However, we must base our decision on the regulatory mechanisms currently in place, which are the 2016 revisions to BLM's western Oregon resource management plans. We cannot speculate how the court's ruling will ultimately effect BLM management going forward. For example, the ruling may stand, it may be overturned by a higher court, or a settlement may be reached to implement yet a different management action. Opportunities to assess any such changes in BLM management, once final, will occur through either our 5-year review or through a new listing petition. Consequently, we base our conclusion on the plans in place at the time of our decision, which is the 2016 western Oregon resource management plans.

(26) Comment: One commenter said that assuming the NEPA process will do good things for fisher is incorrect. Federal agencies document their actions under NEPA and whether they comply with the Endangered Species Act, but the process itself does not provide a conservation benefit.

Our Response: We have not assumed that NEPA will benefit fishers. We explicitly stated in our 2019 Revised Proposed Rule (84 FR 60296), "NEPA does not regulate or protect fishers, but requires full evaluation and disclosure of the effects of Federal actions on the environment." We continue to affirm that statement in this document.

(27) Comment: One commenter stated that the regulatory mechanisms embodied in law enforcement agencies have failed to control illegal cultivation of marijuana on public lands, leading directly to the issues described under the toxicants section of the proposed rule. The proposed rule should acknowledge this fact, recognizing and calling attention to the limitations imposed on the funding and priorities under which these agencies operate.

Our Response: We have acknowledged the inability of law enforcement to keep up with illegal cultivation of cannabis on public lands in this rule (see Exposure to Toxicants section).

(28) Comment: One commenter observed that the proposed rule does not acknowledge existing efforts to address illegal cannabis cultivation on public lands (e.g. increasing California State agency staff; CROP Project (Cannabis Removal on Public Lands), whose goal is to increase funding for trespass grow reclamation, increase USFS Law Enforcement presence, and implement statewide education on health risks of unregulated cannabis). Evaluation of toxicant threat is incomplete without considering the regulatory mechanisms related to cannabis cultivation.

Our Response: We acknowledge the CROP Project and their efforts to reduce and reclaim illegal cannabis cultivation on public lands (see Exposure to Toxicants section). Although we are encouraged to see this citizen-based effort, having only been established since 2018, it is too soon to determine their effectiveness in reducing the threat of toxicants to fishers. While the commenter notes an increase in California State Agency staff to address cannabis cultivation issues, it is not clear if staff is dedicated to illegal grows on public lands, or primarily focused on addressing cultivation permit compliance and illegal cultivation on non-Federal lands. We note that Forest Service law enforcement have observed that State and local resources assisting with illegal cultivation on Federal lands has diminished since State cannabis legalization as resources have been redirected to State and local regulatory compliance (Klassen and Anthony 2019, p. 45).

(29) Comment: One commenter stated that if the fisher is listed, then positive relationships with landowners will be impossible and harm proactive, collaborative, voluntary conservation.

Our Response: We are committed to creating positive relationships with landowners and have many tools available to incentivize collaborative, voluntary conservation for the fisher. Potential voluntary conservation opportunities include as CCAs, HCPS, SSAs, partners projects, and more.

(30) Comment: One commenter stated that listing the fisher would also increase wildfire risk within the fisher's range and blunt the effectiveness of wildfire prevention measures that are already in place. Private landowners are currently implementing a Memorandum of Understanding ("MOU") that is designed to lessen wildfire risks within the fisher's range. If the fisher were listed as threatened or endangered, these wildfire reduction measures would be slowed down and would become less effective. Listing the fisher would also have the consequence of requiring federal agencies to consult under Section 7 of the ESA before taking actions that could affect fisher habitat, including the fuels reduction efforts contemplated under the MOU.

Our Response: The MOU referenced by the commenter pertains to the NCSO DPS area, which is found not warranted for listing in this determination. There is no similar agreement applicable to the SSN DPS. Consequently, we believe the concerns expressed are not applicable to this listing determination. We do not believe that listing the fisher would increase wildfire risk in the SSN DPS because the Service is working with Federal agencies to develop a programmatic consultation process to streamline wildfire reduction activities that provide for the conservation of fisher.

Fisher Biology

(31) Comment: Two commenters pointed out new studies showing that fishers use managed landscapes. They both noted that fishers have been documented using slash piles for denning. One of them also added that fishers use areas near timber harvest units, possibly due to the availability of prey.

Our Response: Fishers use managed landscapes on private industrial timberlands, and this determination reflects this use. Rather than specifically mentioning fisher use of slash piles in our analysis, we considered fisher use of managed landscapes more broadly in vegetation management.

Fuels Treatment

*(32) Comment***:** Some commenters expressed that protecting fishers from extreme wildfire is important, stating that wildfires are prevalent in the DPS and are predicted to increase in frequency. They indicated that high severity burns take decades if not centuries to replace habitat

structures necessary to support fishers and their prey; therefore, thinning projects and prescribed burns are necessary to prevent stand-replacing wildfires.

Our Response: High-severity fires can remove or substantially reduce fisher habitat; thus, we assessed the conservation measures in place to conduct fuel reduction projects (see Voluntary Conservation Mechanisms). The Service is working with Federal agencies within the SSN DPS to develop a programmatic consultation process to streamline wildfire reduction activities that provide for the conservation of fisher.

Habitat

(33) Comment: Once commenter states that the use of OGSI-80 as a surrogate for fisher habitat under-represents substantial areas of occupied fisher habitat in the NCSO and NSN areas and presented their analysis of citations (Zielinski et al. 2012; Niblett et al. 2017; Powell et al. 2019) to support this interpretation. Specifically, they referenced application of the Zielinski et al. (2004) fisher habitat model on managed landscapes. They claim that the model is similar to OGSI-80 in that it is derived from observed fisher use of large, old trees in old forests, primarily on public lands. Applying the model on managed landscapes resulted in lands classified as "poor" by the model actually being occupied by fishers (Niblett et al. 2017; Powell et al. 2019). Thus, the commenter opined that projections of trends based on the OGSI-80 surrogate cannot be relied upon to represent amounts of trends in fisher habitat. The commenter further recommended the Service address the proportion of occupied habitat actually represented by OGSI-80, stating that the OGSI-80 definition excludes substantial amounts of occupied private and Federal land.

Our Response: In addressing the last portion of the comment, our intended use of OGSI-80 is not as a surrogate for fisher habitat, nor to delineate areas on the landscape where fishers may or may not be found. That would not be an appropriate use because the data sources for OGSI-80 (gradient nearest neighbor or GNN) limit the application of the index to the landscape or regional scale and not the site-specific or local scale (Ohman and Gregory 2002, p. 738).

We are not sure why the commenter concluded that the Zielinski et al. (2004) model, derived from observed fisher use of very large old trees and logs in old forests primarily on public lands, is similar to OGSI-80. First, OGSI-80 is not based at all on fisher use of stands. Second, OGSI-80 does not indicate a forest age, but rather structures that are characteristic with where forests are at on a general forest succession continuum, regardless of their age. Hence, a stand meeting the OGSI-80 condition may be younger than 80 years old, and stands substantially older than 80 may not meet the OGSI-80 condition. Third, OGSI-80 was derived from a network of plot data systematically placed across all ownerships, not just Federal lands (Davis et al. 2015, pp. 13-15). We compared OGSI-80 trends between Federal and non-Federal lands in our analysis.

The commenter's conclusion as to why the Zielinski model did not perform as well on private lands assessed by Niblett et al. (2017) does not comport with the conclusion Niblett et al. (2017, pp. 14-15) made. They note that Zielinski compiled a resting habitat suitability score that was a composite of multiple features of fisher resting habitat, such as live tree basal area, large down wood abundance, hardwood basal area, canopy cover, and mean tree age. Such an overall composite may be less meaningful in characterizing fisher habitat on landscapes assessed by Niblett et al. (2017, entire) than just assessing the structural attributes that fishers use especially because forest cover is so low for such a large part of their study area. In that light, OGSI-80 is similar in that it is characterizing a single component of fisher habitat, the structural habitat components that fishers are associated with, so long as forest canopy cover meets a minimum of 10 percent. We note that Niblett et al. (2017, p. 15) still found that, even in their heavily managed landscape with large areas absent of forest cover, fishers still denned in the largest available trees on the landscape. Depending on the vegetation zone that encompasses the Niblett et al. (2017, entire) study area, the OGSI-80 minimum structural element thresholds (Davis *et al.* 2015, p. 16-18) may or may not exceed the den tree and snags used by fishers in Niblett *et al.* (2017, p. 15). Nevertheless, OGSI-80 is not meant to map where fishers may occur on the landscape, or to quantify fisher habitat characteristics, but to characterize trends in those structural elements that fishers use.

(34) Comment: One commenter stated that in areas occupied by breeding female fishers on the Stirling Management Area, some habitat suitability models based on fisher use of forests with large trees performed very poorly in predicting fisher home ranges (Powell et al. 2019, Figure 28 and others). Consequently, OGSI-80, being based on large trees, will not represent areas used by fishers on these landscapes.

Our Response: As stated in earlier comments, OGSI-80 is not meant to map where fishers may occur on the landscape, or to quantify fisher habitat characteristics, but to characterize trends in those structural elements that fishers use. We also want to clarify the results of the analysis that the commenter is describing (Powell et al. 2019, Figure 28 and others). There are certainly areas of habitat classed by the different models assessed as either moderate fisher habitat or even relatively high quality fisher habitat (e.g. Powell et al. 2019, Appendix 2, pp. 64-65) which fishers avoided. The authors suspect lack of other vital habitat components in these stands, such as hardwoods, may be the reason, though this needs further study (Powell et al. 2019, Appendix 2, pp. 69-70). Nevertheless, for most of the models assessed in Powell et al. (2019, Appendix 2), fishers still selected habitats on the landscape that generally encompassed largest tree category and greatest canopy cover.

(35) Comment: One commenter believed our statement that substantial amounts of unoccupied fisher habitat could suggest that habitat is not limiting for fisher and, therefore, habitat loss is not a threat was misleading. They note that there is not a lot of unoccupied habitat in the SSN south of the Merced River, and, indeed, habitat may very likely be a limiting factor, especially for females in the currently occupied area. Unoccupied habitat north of the Merced may not be accessible due to dispersal barriers (Merced River, high severity fire areas, and heavily used roads in Yosemite NP) and, therefore, is not de facto evidence that habitat is not a limiting factor.

Our Response: We recognize in the final rule that the interaction of all the threats within the SSN DPS are likely limiting northward expansion into what is considered suitable habitat for fisher. In general, fisher habitat is lacking landscape scale forest heterogeneity in the SSN DPS compared to historic conditions, with wildfire and severe drought disturbances creating large patches of homogenous habitat, which are exacerbated by past logging practices and wildfire suppression (Thompson et al. 2019a, p. 13).

(36) Comment: The proposed rule's estimation of habitat trend is inconclusive and does not indicate substantial decline. If the definition of habitat is corrected to include the known fisher

distribution, fisher habitat has in fact dramatically expanded. This expanded range is demonstrated by a 24% increase in the occupied range since the CDFW estimate in 2010.

Our Response: We do not agree with the conclusion that habitat usable by fisher has dramatically expanded. A range expansion for fisher or any other species does not automatically mean that habitat has increased. Many factors serve to limit species distribution (e.g. connectivity and fragmentation, prey and predators, population demographics), and these factors may or may not be affected by habitat. Although not perfect, our analyses for vegetation management and wildfire show losses of either fisher habitat or structural elements used by fishers (as represented by OGSI-80). Further, the OGSI-80 analysis, which incorporates ingrowth and is only for the NWFP portion of the NCSO DPS, indicates a net loss of this structural condition type. In the SSN, areas within the previously known fisher distribution experienced a reduction of nearly 40% due to fire, drought, and associated tree mortality. Although we expect ingrowth to occur, we are uncertain how soon the landscape will be considered fisher habitat, particularly because large trees that often act as a seed source for future regeneration were disproportionately affected.

The number of fishers in the NSN subpopulation is increasing and with this increase, fishers are expanding and using new habitats. We are encouraged by this expansion and commend SPI, CDFW, and other partners for their efforts. However, we conclude that this expansion is due to reintroduction efforts, not because of an increase or expansion of new habitat. Prior to the reintroduction, the habitat existed and was available, but it was unoccupied.

The commenter suggests that fisher's range has expanded by 24% since a CDFW estimate in 2010. Based on the maps provided and the comment, we assume this refers to a 24% increase in the occupied range for NCSO. Judging expansions or contractions in fisher populations from ranges drawn by humans on a map can be problematic because the polygons created might not capture areas that haven't been surveyed, they likely do not consider variable survey efforts (i.e. opportunistic versus systematic camera surveys), or a line may closely or loosely follow a boundary (which can greatly skew comparisons). In this case, the CDFW polygon does not include the NSN subpopulation, nor does it include all the known fisher sightings in the area at the time, nor does it consider areas that may have been under-surveyed. Furthermore, since CDFW 2010 is a California specific analysis, it does not include areas in Oregon that are occupied by fisher.

In the most recent review of fisher, CDFW concludes that fishers currently occupy much of their historical range in northwestern California and may have expanded in the redwood region (CDFW 2015, p. 23); fisher detections have increased in northern coastal California since the 1990s, though it is not known as to whether this increase is due to a range expansion, recolonization, increased survey effort, or whether fishers remained undetected in earlier surveys (CDFW 2015, p. 50).

In our draft and final Species Report, we reviewed fisher data (from 1994 - 2013) for accuracy and minimized repetitive individual sightings. When we use this data and overlay it with the California Natural Diversity Database (reviewed for accuracy), SPI, Collins, efforts in southern Oregon (captured for NCSO in current condition above), and historical locations before 1994, the majority of new locations are infill within the bounds of our 1994-2013 data (Service 2020, map). There are a few areas where we see new fisher sightings, particularly along the eastern edge of the species range. In Oregon, we expect these new locations are largely a product of increased survey effort or research activity rather than an actual increase in the range, because there are numerous historical sightings in these areas. In California, some of this expansion is because of reintroduction efforts at Stirling, but some may also be because of an increase in range, or increased survey efforts. We are also aware of a few areas where contractions have been reported in Southern Oregon near the Biscuit Fire and the SOC subpopulation. We conclude that there has been a recent range expansion because of the reintroduction effort in the NSN subpopulation. There have also been some small contractions. And, there have been some small expansions, but we are unclear if these are actual expansions or the result of increased survey effort.

Habitat Recruitment

(37) Comment: A couple of commenters stated that OGSI-80 is a poor surrogate for fisher habitat and demonstrably under-represents substantial areas of occupied fisher habitat in the NCSO and NSN areas and is not the best scientific information. There is little evidence that OGSI-80 represents or correlates with fisher habitat. It may be appropriate for predicting NSO habitat, but there is little evidence that predicted habitat for NSO is similar to fisher habitat (cites Zielinski et al 2006). Trends in OGSI-80 should only be used to represent habitat in areas where that habitat type occurs and should not be relied upon to represent fisher habitat trends elsewhere.

Our Response: We have revised our vegetation management section to clarify our use of the OGSI-80 forest condition. We have explored several avenues to assess trends in fisher habitat in the absence of an available DPS-wide model that displays changes in fisher habitat over time. For our 2014 Proposed Rule, we used northern spotted owl habitat as a surrogate for fisher habitat because that allowed us to estimate losses through timber harvest. However, comments from peer reviewers and the public criticized our use of spotted owl habitat and that it may not properly represent fisher habitat. They also wanted us to consider ingrowth of fisher habitat and its role in replacing habitat lost to disturbances such as vegetation management and fire. Hence, we have used OGSI-80 because it is a forest stand condition that is mapped throughout most of the NCSO portion of the DPS. We do not consider it as a model for fisher habitat and realize that it may include areas that are not considered suitable for fishers, as well as not capturing all suitable fisher habitat. It does, however, allow us to assess regional-scale trends in the forests that contain the structural elements consistently used by fishers (large snags, down wood, and large live trees). Although several commenters believe this is not the best available data, they have provided no alternatives to assess trends in this structural condition (both loss and recruitment) at a regional scale across the DPS.

Regarding the comment that OGSI-80 should only be used to represent habitat in areas where the habitat type occurs, we do not consider OGSI-80 a habitat type. It represents a structural condition used by fishers. The OGSI-80 condition has the potential to be found anywhere the forest vegetation zones upon which it was built occur (Davis et al. 2015, pp. 9-10, Figure 4), which is all forested zones within the NWFP portion of the DPS. Hence, we are not applying it in areas outside of its intended use.

(38) Comment: Regarding our use of OGSI-80 to document trends in vegetation important to fishers, one commenter believed it is unlikely that 80-yr old conditions would represent fisher habitat unless those stands contained much older features. Another commenter noted that in using OGSI to measure ingrowth of fisher habitat, the Service has no idea if the stands with ingrowth have structures needed by fisher. Hence, the Service should not assume that recently developed OGSI-80 stands are of a quality 80-yrs post-harvest to support fisher denning.

Our Response: See our responses above regarding our intent in our use of OGSI-80. OGSI-80 stands are meant to represent mature forest stands with old-forest remnants. The OGSI-80 threshold represents the general point in the forest succession time scale when forests in the NWFP area begin to develop stand structure associated with older forest (Davis et al. 2015, p. 18, figure 2) and includes older forest stands on that succession time scale as well. For stands to meet the OGSI-80 threshold, they had to have greater than 10 percent canopy cover and meet minimum tree and log size criteria, depending on the vegetation zone (Service 2016, p. 102). For the Douglas-fir and white fir/grand fir forest vegetation zones, which comprise much of the NCSO, OGSI-80 stands had to have at least 1 large live tree greater than 75 cm (29.5 in) dbh or an average stand diameter greater 37.5 cm (14.25 in) dbh. In addition, stands had a minimum snag size of 50 cm (19.7 in) dbh and minimum log diameter of 25 cm (9.8 in) (Davis et al. 2015, pp. 17-18, table 5). Although average size of trees and snags used by fishers are often substantially larger than the minimum tree and snag diameters used to define OGSI stands, structures of this size have been used by resting and denning fishers in study areas in the DPS (e.g., Lofroth et al. 2011, pp. 38, 52,57, 78). As we acknowledged in the vegetation management section, OGSI-80 does not represent all fisher habitat, and it may define areas that aren't used by fishers. But, it fairly represents trends through time of forest structures used by fishers.

(39) Comment: One commenter stated that the proposed rule seems to significantly overstate the threats to the NCSO population and the cited data seems contradictory. Specifically, the rule states that fire is removing 8 percent of habitat/decade, yet the OGSI-80 analysis shows only a 1 percent loss/decade, if that, because of ingrowth (which is ignored when describing removal by wildfire). The rule further states that ingrowth is expected to increase in the coming decade, which would seemingly more than compensate for any loss from any of the disturbances evaluated.

Our Response: We have revised our discussion of wildfire threats to clarify the distinction between the Davis et al. (2015, entire) analysis of loss of OGSI-80 forest to wildfire in the NWFP portion of the DPS (which covers the NCSO portion of the DPS) and the analysis done by the Service to more directly assess fisher habitat loss to wildfire. We assume that the commenter's statement that fire is removing 8 percent/decade of fisher habitat is referring to our projection that 4 to 8 percent of fisher habitat would be lost to wildfire over the next 40 years in the NCSO portion of the DPS, based on our analysis done in the draft species report (Service 2014, p. 64). That analysis was done by overlaying mapped fisher habitat (as determined through modeling) with severity data from fires that had occurred from 1984 to 2011. We updated that analysis to include more recent fires in the NCSO area (data from 2008 to 2018) and found that 7 percent of fisher habitat was lost to high-severity wildfires during that time period. Davis et al. (2015, pp. 30-31, Tables 6 and 7) looked at loss of OGSI-80 stands to wildfire from 1993-2012, and their results differ from ours likely for several reasons, with the primary one being that they looked at a different time period than we did and did not capture more recent fires. In addition, their analysis did not include portions of the NCSO DPS that are outside of the NWFP area.

While forest ingrowth is expected to increase in the coming decades, so is loss of habitat to wildfire. Hence, we cannot conclude whether or not ingrowth will fully compensate for projections of loss of fisher habitat. Upon reconsideration of the threats and the current condition of the NCSO DPS, we have determined that the NCSO DPS of fisher is not in danger of extinction throughout its range, nor likely to become so in the foreseeable future.

(40) Comment: One commenter stated that habitat trend analysis based on OGSI-80 is inadequate to fully describe fisher habitat ingrowth. Growth is occurring on all lands excluded from OGSI-80 definition, yet growth is recognized on Federal lands only for the OGSI-80 type. Growth on remaining occupied federal lands and private lands is acknowledged but its importance is not considered. The Service should consider the implications of estimated future habitat ingrowth and fisher population response (see Powell et al. 2019 final report, p. 25).

Our Response: We are not using OGSI-80 to quantify the amount of fisher habitat ingrowth. It is a means to assess the trends of those old-forest structural components used by fishers throughout the DPS (see our responses above). Our analysis accounted for ingrowth on non-Federal lands, in including the data from Davis et al. (2015, pp. 30-31) which addressed ingrowth from both Federal and non-Federal lands. Ingrowth was over three times greater on non-Federal lands than on Federal lands (13.5 percent on non-Federal lands and 4.2 percent on Federal lands, for a total ingrowth of 8 percent on the combined ownerships over the 20 year analysis period) within the combined provinces of the Oregon Klamath, California Klamath, California Coast Range, and California Cascades within the NWFP area of the DPS. Regarding the reference to Powell et al. (2019, p. 25), we have incorporated their assessment of the status of the Stirling reintroduced population into our analysis.

(41) Comment: One commenter stated that habitat trends in the HCP/CCAA covered lands within the NCSO will be stable to increasing over the foreseeable future. Combined, these habitat trends do not support a habitat related likelihood of endangered status in the foreseeable future.

Our Response: Upon further analysis and consideration of comments, we have determined that the NCSO DPS is not in danger of extinction in the foreseeable future.

Implementation of Specific Conservation and Recovery Actions

(42) Comment: One commenter requested implementation of specific conservation or recovery actions for fishers throughout the West Coast States, including research and management activities that would improve the overall landscape for fishers. The actions (e.g., cessation of logging and trapping) were recommended to the Service because the commenter believed they would ensure the long-term conservation of the fisher.

Our Response: We appreciate the recommendations provided to conserve fishers and their habitat. Although no comprehensive strategy for fishers in the West Coast States exists, we acknowledge conservation measures, strategies, and actions that may benefit fisher conservation in this rule. We also recognize that specific management activities can increase forest resiliency, and although there may be short-term negative effects to fishers, certain actions are likely to have an overarching, net beneficial impact for the conservation of fishers in this DPS.

Other Stressors

(43) Comment: One commenter took issue with the following statement from the 2019 Revised Proposed Rule: "Now, these small populations of Pacific Fisher are threatened by the use of toxic rodenticides by marijuana growers, and increasing fire severity exacerbated by climate change, along with loss of habitat due to logging." The commenter states that increasing fire severity exacerbated by climate change and loss of habitat due to logging are theory only, and that only rodenticide is the real threat. The commenter asserts that no significant climate change has taken place in the western Cascades since 1650 and that there has been little to no logging taking place that affects the habitat in question. Protection of fisher from the threat of poisoning due to toxic rodenticides can, and should be, done by local ordinance, not by putting our lands at risk from further mismanagement by restricting activity and efforts to reduce current catastrophic fuel loads. The commenter then went on to state that the true danger to fisher is, and will continue to be, catastrophic wildfire, and management efforts for that purpose must continue unimpeded.

Our Response: Our threats analysis considered the best available science and considered them holistically when making our final decision (see Threats sections above for specific information about each threat). In addition, we recognize the importance of fuels reduction treatments that promote forest heterogeneity while retaining structural elements important to fishers (for example, see Voluntary Conservation Measures section above).

Policy

(44) Comment: One commenter asserted that we should more closely evaluate the five listing factors to ensure that we are acting on the basis of the best scientific and commercial data available, rather than speculation or supposition.

Our Response: Our Policy on Information Standards under the 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 (*www.fws.gov/informationquality/*), provide criteria and guidance, and establish procedures 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 list a species (or DPS) as an endangered or threatened species. We use information from many different sources, including articles in peer-reviewed journals, scientific status surveys and studies completed by qualified individuals, Master's thesis research that has been reviewed but not published in a journal, other unpublished governmental and nongovernmental reports, reports prepared by industry, personal communication about management or other relevant topics, conservation plans developed by States and counties, biological assessments, other unpublished materials, experts' opinions or personal knowledge, and other sources. We have relied on published articles, unpublished research, habitat modeling reports, digital data publicly available on the Internet, and the expert opinion of subject biologists to aid in the determination that the SSN DPS of fisher meets the definition of an endangered species.

Also, in accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited peer review of the 2014 Species Report (Service 2014, entire) from knowledgeable individuals with scientific expertise that included familiarity with the species, the geographic region in which the species occurs, and conservation biology principles; their feedback was incorporated into the 2016 Species Report (Service 2016, entire), which remains the foundation of our research along with our additional analysis presented in the 2019 Revised Proposed Rule and this final rule. Additionally, we requested comments or information from other concerned governmental agencies, Native American Tribes, the scientific community, industry, and any other interested parties over multiple comment periods for both the 2014 Proposed Rule and the 2019 Revised Proposed Rule (see *Previous Federal Actions*, above). Comments and information we received helped inform this final rule. Also, we revisited our threats analysis and determined that the NCSO DPS is not warranted for listing.

(45) Comment: Three commenters stated that our discussion of the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE) Policy in the proposed rule was insufficient, and asserted that we should conduct a PECE analysis. Two of these commenters stated that conducting this analysis would result in a decision that the species is not warranted for listing. The third commenter also claimed that we failed to consider numerous existing conservation efforts (e.g., MOUs or HCPs that address wildfire risk and enforcement programs) that were developed to benefit fishers and other species that inhabit forested lands. The third

commenter also claimed that the revised proposed rule did not explain why the variety of existing regulatory mechanisms and voluntary conservation measures are not at a scale or magnitude sufficient to ameliorate the primary significant threats. Generally, these commenters stated or implied that we could not reach a conclusion to list the species as endangered or threatened when no analysis under the PECE Policy or a cumulative effects analysis is conducted.

Our Response: Upon determining that our status assessments would be conducted individually on the NCSO DPS and SSN DPS, we then evaluated threats and any potentially ameliorating measures specific to each. For the NCSO DPS, as discussed above in its specific Determination section, our analysis found that the cumulative effect of threats acting on the DPS at their current scale and magnitude did not cause the DPS to be in danger of extinction throughout all or a significant portion of its range, now or in the foreseeable future, especially given the DPS's overall resiliency, redundancy, and representation. While we acknowledged and evaluated various regulatory mechanisms and conservation efforts, and the potential benefits they may provide to the DPS, we did not rely on them for our conclusion that the NCSO DPS did not meet the definition of either an endangered or threatened species. As such, no PECE analysis was necessary.

For the SSN DPS, our analysis found that the cumulative effect of threats acting on the DPS at their current scale and magnitude do cause the DPS to be in danger of extinction throughout all of its range, in light of the anticipated effect of the identified threats on the DPS's overall resiliency, redundancy, and representation. Our analysis included consideration of any potential benefits provided to the SSN DPS by existing regulatory mechanisms, as well as potential benefits that may result collaterally from existing voluntary conservation efforts that were not developed for fisher conservation. In addition, we considered the benefits resulting from an existing voluntary conservation strategy, while noting that changed circumstances arising from tree mortality events in the range of the SSN DPS will require revisions to some of the strategy's conservation measures. While all of the conservation efforts identified are being implemented and are effective in some measure, and therefore not requiring a PECE analysis, we found that they are not ameliorating the threats such that the SSN DPS did not meet the definition of an endangered species.

(46) Comment: One commenter claimed that we did not explain what new scientific and commercial information was developed between the 2016 withdrawal (81 FR 22710, April 18, 2016) and the 2019 Revised Proposed Rule. The commenter stated that we changed our position regarding the efficacy and desirability of establishing conservation agreements even though developing and adopting these types of agreements has expanded over time.

Our Response: The *Summary of Changes* section of the 2019 Revised Proposed Rule noted new information since completion of the 2016 Final Species Report (Service 2016, entire) that we evaluated in that proposal. Our analysis of all new information since the 2016 final Species Report was summarized and cited where applicable in the 2019 Revised Proposed Rule and this final rule, including new information received during the public comment periods on the 2019 Revised Proposed Rule.

With regard to conservation agreements, we heavily rely on voluntary conservation efforts to provide for the conservation and aid in recovery of listed species. As stated above, we have previously and continue to believe that our relationship with private, State, tribal, and Federal landowners is imperative for the conservation of fishers. We intend to continue to work cooperatively with partners and assist where possible.

(47) Comment: One commenter claimed that the revised proposed rule failed to provide a rational explanation for changing a conclusion (in the 2016 withdrawal) that none of the threats were resulting in species-level impacts. Additionally, the commenter asserted that we eliminated discussion of species-wide threats and instead argued that individual-level threats cumulatively rise to the level that listing is required without showing how each of the potential threats actually affects the species.

Our Response: In this final rule, the Service has examined again the threats and impacts to the fisher populations, and that analysis has led to the conclusions and rationale supporting this final determination. Addressing the commenter's concern, our rationale in the Threats sections on this final rule explains how the various threats impact the species.

(48) Comment: One commenter argued that we should have analyzed whether the West Coast DPS of fisher is endangered in a significant portion of its range.

Our Response: Please see our response to *Comment 14* regarding the DPSs analyzed for this effort. As presented herein, our analysis of the NCSO DPS indicated that it was not in danger of extinction throughout all of its range, nor likely to become so in the foreseeable future. Upon reaching that conclusion, we conducted an analysis to see if there were any portions of the NCSO DPS that warranted further consideration as being in danger of extinction or likely to become so in the foreseeable future in any significant portion of its range. We did not find any such portion, and concluded that the NCSO DPS is not in danger of extinction or likely to become so in the foreseeable future in any significant portion of its range. Regarding the SSN DPS, our analysis indicated it was in danger of extinction throughout all of its range, and therefore did not conduct an SPR analysis.

Population Estimates

(49) Comment: The proposed rule incorrectly states that the Hoopa population was declining during 2005-2012 (84 FR, at 60285, col 2). This conclusion is not valid because reported lambda confidence intervals overlapped 1.0. The relevance of these data 7 years later is not evaluated. Also, as noted in comments on the 2014 listing proposal, this decline only brought the Hoopa population from an atypical high density to a density similar to other populations in the surrounding region, a fact not noted in the rule.

Our Response: While there is uncertainty in concluding whether the population is increasing or decreasing given that the lambda confidence intervals overlap 1, the lambda value of 0.992 for the Hoopa study is a statistic that indicates a declining population during the time period measured. We don't have additional population data from that study area to indicate the population trend since 2012. Regarding the decline from an "atypical high density" to a level similar to other fisher populations in the area, the commenter is referring to Matthews et al. (2011, p. 72) where fishers declined from a density estimate of 52 (per100 km^2 (38.6^2)) to 14 between 1998 and 2005. This decline preceded the 2005 to 2012 analysis. We don't know whether the slight population decline observed between 2005 and 2012 is a continuation of the overall decline from 1993, a reflection of a population that is currently fluctuating around carrying capacity, or some other phenomenon.

(50) Comment: One commenter stated that Green *et al.* (2019b) (as yet unpublished) acknowledged that their results only describe a short-term situation and confined speculation about implications to their discussion section. The 2019 Revised Proposed Rule did not acknowledge that some of the fishers displaced by fire may have survived to emigrate and may not have been lost to the larger regional population. The commenter also stated that the proposed rule did not acknowledge or evaluate the overlap in credible interval values from the post-fire and pre-fire population estimates, nor that the upper credible value post-fire estimates approached the mean pre-fire estimates (see Green *et al.* 2019b, Table 2 and Fig 2). The commenter asserted that the proposed rule uncritically applies this estimate of post-fire loss to the analysis that concluded there has been a 7 percent loss in habitat since 2008. The commenter claimed that these oversights create unacknowledged uncertainty as to the validity and application of this estimate, compounded by issues with the 2014 modeling that was addressed in comments at that time, but not acknowledged in the 2019 Revised Proposed Rule.

Our Response: We elaborate more on Green et al. (2019b, entire) in this rule, noting the observation that the post-fire population estimates have confidence intervals that overlap with pre-fire estimates, as well as the uncertainties in the ultimate fate of fishers in response to wildfire.

Regarding our evaluation of fisher habitat loss to wildfires and the commenter's assertion that we "uncritically" applied the estimate of post-fire habitat loss in Green et al. (2019b, p. 6) to that analysis, we are referring to the authors' definition of high severity fire, which is a basal area mortality of >=50 percent. We acknowledge that fishers may begin moving about these stands within a decade or two after fires once stand growth is initiated. However, our use of the Green et al. (2019b, p. 6) definition of high-severity fire for the purposes of quantifying the acres of fisher habitat that may be unavailable to fishers in the short term is a reasonable approach and is not inconsistent with observations of fisher avoidance of areas with <=30 percent canopy cover (Spencer et al. 2016, p. 10, footnote 7).

The use of the fisher habitat model continues to remain the best available science regarding a large-scale map of fisher habitat across the fisher range. The comments and responses regarding the fisher habitat model in the 2016 Withdrawal do not lead us to conclude that our assessment of habitat loss was flawed, particularly because it was done at the DPS-wide scale. We can't know whether the estimate of 7 percent of fisher habitat lost based on modeling is precise, but it is a reasonable estimate given the landscape scale application of the fisher habitat model.

(51) Comment: One commenter pointed out that the 2019 Revised Proposed Rule concedes that it is unknown whether fisher populations are stable or declining. The commenter asserted that the proposed rule should evaluate the implications of the lack of conclusive information that fishers in the DPS are declining. Additionally, they stated that the lack of conclusive evidence of decline should increase the burden of proof that the other threats are indeed demonstrable, conclusive, and serious. According to the commenter, given the substantial expansion of the

range (see comments under range expansion), the Service must also consider whether the population size within the NCSO and SSN subpopulations is likely to be expanding. (pp. 8-9), and if there is no evidence of population decline, evidence of effects of threats must be conclusive (p. 11).

Our Response: To clarify the statement relied upon by the commenter, we stated in our 2019 Revised Proposed Rule that, based on the information available regarding population growth data, we could not conclude that populations were stable, increasing, or declining. All three scenarios are plausible, given the available data. However, we also note that the lack of conclusive evidence of a decline is also not conclusive evidence that there is no decline. The commenter further suggests that, in the face of inconclusive evidence for a population decline, we must then provide conclusive evidence that threats acting on a species must be demonstrable and serious. In response, we reiterate that we did not conduct our analyses using an assumption that populations are declining. We merely presented the available information regarding population growth, while at the same time presenting our analyses of how both threats and conservation measures are likely to affect the viability of each DPS.

(52) Comment: One commenter noted that the proposed rule considers Higley et al. (2014) and Green et al. (2019b), but does not evaluate other material in our possession, specifically Powell et al. 2019, which stated, "Our best estimates of survival and reproduction are consistent with a stable or growing population on Stirling." Although this study differs from the Higley and Green studies in that it was initiated in an area newly occupied by fishers, it was of similar duration to both of them and the population size was similar to Higley et al (2019) and larger than that of

Green et al (2019b). The conclusions from Powell et al. (2019) are worthy of qualified evaluation in an objective assessment of fisher population trend in NCSO.

Our Response: We incorporated information from Powell et al. (2019, entire) regarding the growth trend of the Stirling reintroduced population into our analysis for this rule.

(53) Comment: One commenter stated that available scientific information indicates that fisher population trends are not declining and, in Northern California, they likely are stable or increasing. The commenter asserted that these trends have probably contributed to the substantial expansion of the species' range within the last 9 years. The commenter concluded that there is no evidence of declines at the population scale.

Our Response: In the Current Condition section for the NCSO DPS in this rule, we elaborate on population variability in general and how that may affect any interpretation of the available data on NCSO populations. We are not aware of any substantial expansion beyond the Stirling translocation and the subsequent growth of that subpopulation.

(54) Comment: One commenter stated that the 2019 Revised Proposed Rule describes significant uncertainty regarding fisher population status and trend using prior data, despite the availability of scientific studies that were developed with robust sample design and effort. This commenter cited multiple references for inclusion such as Furnas *et al.* 2017 and Powell *et al.* 2019.

Our Response: We incorporated the population estimate of Furnas et al. (2017, p. 12) and the conclusions regarding the Stirling (northern Sierra Nevada) subpopulation into our analysis of the NCSO DPS (see the Current Condition section of the NCSO DPS analysis). We incorporated a discussion of the fluctuating nature of populations over time and acknowledge the fisher's ability to sustain populations within the DPS in the presence of ongoing stressors.

(55) Comment: One commenter claimed that the Service changed its interpretation of confidence intervals with no rationale for the change. They request that the Service explain how to interpret a confidence interval so the public and reviewing courts will understand the technical basis for the Service's conclusions.

Our Response: For population monitoring studies, we have moved away from discussing confidence intervals around lambda, preferring instead in this final determination to discuss the fluctuations in lambda we see and how they likely represent normal fluctuations of a population at or near carrying capacity (see NCSO Current Condition above).

(56) Comment: One commenter noted that even though one catastrophic wildfire damaged habitat for several individual fishers, it would be improper for the Service to use one event as justification for listing a species. Instead, the Service should be reviewing the entire administrative record, and affording one event the weight it deserves in terms of predicting overall population trends for the species.

Our Response: We have based our determinations for the NCSO and the SSN DPS on the best scientific and commercial data available. We evaluated threats to the species and assessed the cumulative effect of the threats under section 4(a)(1) of the Act. For the NCSO DPS, we determined that, in part, because of the population's widespread distribution combined with resiliency and redundancy, it did not warrant listing. For the SSN DPS, we concluded that, in part, the small population size, combined with substantial habitat loss as a result of recent tree mortality among other factors, warranted listing as endangered. In conclusion, we have based our decisions on a multitude of factors, not on a single event.

Rodenticides

(57) Comment: Several commenters asserted that rodenticides (anticoagulants or neurotoxicants) are a significant threat to the DPS, and that we underestimated the risks to the species in the 2019 Revised Proposed Rule. Some of these commenters provided information on this threat, such as illegal grow site activity in Oregon. Another commenter expressed concerns related to staffing constraints on Federal lands that have delayed and likely will continue to delay clean-up activities. Another commenter was concerned that emotional reaction stimulated by the proposed rule's description of the potential effects of anticoagulant rodenticides and the potential extent of this threat may influence the perception of the actual magnitude of the effect to fishers. Additionally, the commenter claimed that the Service did not address an important gap in present knowledge about anticoagulant rodenticides within the species range, i.e., the degree to which exposure influences mortality of fishers within the DPS, which the commenter asserts should have substantial bearing on any conclusion about the magnitude of this threat.

Our Response: Toxicants, especially rodenticides, are a threat to fisher in both the NCSO and the SSN DPSs. And, we agree that finding and cleaning up after illegal grow sites is problematic from an ecological, funding and staffing perspective. We also agree that the description of toxicant poisoning elicits an emotional response. At this time, our evaluation of the best available scientific and commercial information regarding toxicants and their effects on fishers leads us to conclude that individual fishers within both DPSs have died from toxicant exposure, fishers suffer a variety of sublethal effects from exposure to rodenticides, and the potential for illegal grow sites within fisher habitat is high. But, it is difficult for us to accurately estimate the effects these rodenticides are having to fisher as a whole because we don't understand what proportion of the population is being negatively affected (i.e. mortality or sublethal effects).

For the NCSO DPS, in spite of the ongoing impacts from toxicants, the NCSO population seems to be withstanding this threat. For example, the Stirling reintroduction in the NSN subpopulation has grown to the point where the population is self-sustaining, despite the fact that rodenticide exposure rates are similar to other areas in California (Gabriel *et al.* 215, entire; Powell *et al.* 2019, p. 16). And, fisher at EKSA in the Klamath mountains in California near the Oregon border do not show a long-term decline (Powell *et al.* 2014, p. 18), despite the fact that illegal grow sites are in the area.

For the SSN DPS, because this DPS is much smaller, the lethal and sublethal effects of toxicants to individuals have the potential to have population-level effects and reduce the resiliency of the DPS as a whole.

(58) Comment: Two commenters stated that rodenticides are subject to increased regulation in Oregon and California; although a timeframe for this comment was not included, we assume the commenters were referring to the time since recreational marijuana use became legalized in Oregon (2015) and California (2016). Further, one commenter argued that legalized and increased regulation will reduce trespass and improve environmental cleanup and restoration of

public lands damaged by illegal marijuana cultivation (although no data was provided by the commenter).

Our Response: As discussed in the general Exposure to Toxicants section above, the data are mixed with respect to how legalization is affecting illegal grows sites on public lands. For example, some information shows that illegal grow sites on National Forests have decreased in States where marijuana was legalized (Klassen and Anthony 2019, p. 39; Prestemon et al. 2019, p. 1). On the other hand, many law enforcement officials have found no indication that illegal grow sites have decreased with cannabis legalization, and it may in fact be increasing, in part due to legalization providing an effective means to launder illegal marijuana (Hughes 2017, entire; Bureau of Cannabis Control California 2018, pp. 28, 30; Sabet 2018, pp. 94–95; Fuller 2019, no page number; Klassen and Anthony 2019, p. 45). Illegal grow sites appear to be dropping in number but are getting larger (impacting more fisher home ranges) (Gabriel 2018, pers. comm.). And, law enforcement actions have caused illegal grow sites to disperse further which makes them more difficult to locate (Gabriel 2018, pers. comm.). At this time, it is difficult to reach conclusions about trends in the abundance and frequency of illegal grow sites this soon after legalization.

(59) Comment: One commenter claimed that it is valid to extrapolate known levels of anticoagulant exposure to areas where little exposure research has occurred (e.g., Stanislaus National Forest), given the high rate of fisher's exposure in the Southern Sierras. The commenter also claimed that the risk to small population(s) from rodenticides undercuts any chance of population recovery.

Our Response: Illegal grow sites are distributed as discrete patches throughout much of the NCSO and SSN DPSs. In the absence of data, it is reasonable to assume the opportunity for fisher to be exposed to toxicants is similar across much of the NCSO and SSN DPSs (except at higher elevations where the growing season is shorter and it is harder to grow marijuana). We also agree for the SSN DPS, because this DPS is much smaller, the lethal and sublethal effects of toxicants to individuals have the potential to have population-level effects and reduce the resiliency of the DPS as a whole. As to the comment stating the risk to small population(s) from rodenticides undercuts any chance of population recovery, no further evidence was provided to support this claim. It is the intent of the ESA that species will eventually be recovered.

(60) Comment: One commenter asserted that voluntary conservation efforts on non-Federal lands (CCAAs and HCPs) mitigate and decrease the threats to fishers from toxicants, further articulating that these conservation measures aggressively prevent illegal drug growing that use anticoagulant rodenticides.

Our Response: We do not have information that allows us to compare and assess the distribution of illegal grow sites on private versus public lands. Nor do we have information on how many acres may benefit from limiting access to private lands or information on how many patrols are being added across what area and at what frequency. Similarly, we do not have information that allows us to address how the voluntary conservation measures may or may not be affecting illegal grow sites. Further, not all voluntary conservation efforts include measures that address illegal grow sites (e.g. the Oregon CCAAs). The job of preventing illegal grow sites across large areas is extremely difficult and comes with large staffing and resource needs. Although we cannot quantify the effectiveness of these voluntary conservation measures at lessening the threat from toxicant exposure at illegal grow sites, we do expect limiting access will make it more difficult to establish illegal grow sites. And, increased patrols (depending on the number of patrols and the scale of the landscape they are visiting) will act as a deterrent. We support voluntary conservation efforts to limit the impact of toxicant exposure from illegal grow sites to fisher.

Range Expansion

(61) Comment: Several commenters claimed that the range of the fisher in the NCSO subpopulation expanded. Some of these commenters provided maps delineating occupied fisher range (as determined by CDFW in 2010 and 2015), fisher location data from 1980 to 2019, and the Service's West Coast Fisher DPS boundary in support of their conclusion. Further, they questioned the magnitude of impact of purported threats in light of this expansion.

Our Response: The maps provided by the commenters were developed using data sets, from different time periods and are not directly comparable. Further we did not receive data during the 2019 Revised Proposed Rule comment periods to suggest that the range of the fisher had expanded. The data we did receive confirmed what we understood about the distribution of fisher and presented in our 2019 Revised Proposed Rule. Please also see our response to comment above and our Determination of Status for the NCSO DPS addressing the magnitude of the threats. We find that the fisher NCSO DPS is widespread and common to the point where listing is not warranted at this time.

Cumulative Effects

(62) Comment: One commenter asserted that the Service's analysis of cumulative effects was missing from the proposed rule. Further, the commenter claimed that the threats analysis did not support the Service's determination that the existing regulatory mechanisms are not sufficient to address the cumulative impacts of the primary threats, specifically referring to exposure to toxicants and habitat loss and fragmentation due to wildfire and vegetation management. Additionally, and in contrast, we note our receipt of a peer review comment on the 2014 Proposed Rule indicating that synergistic (cumulative) effects, primarily climate change and its secondary effects from wildfire, pose the most serious long-term threat to fisher populations, especially in California.

Our Response: In evaluating the status of a species or DPS, we identify both the threats acting upon it and any conservation efforts or mechanisms that may ameliorate those threats. In identifying threats, we describe them in the context of the five listing factors, and evaluate the scale and magnitude of their effect on the species in light of their impacts on the resilience, redundancy and representation of the species. A species' overall status with regard to whether it warrants listing is based on our assessment of the cumulative effect of all threats and ameliorating measures combined. This cumulative analysis is found in the *Determination* section of both our 2019 Revised Proposed Rule and this current document.

(63) Comment: One commenter claimed that little, if any, actionable measures exist that could address the individual-level threats identified by the Service in order to recover the species. The commenter asserted that those who wish to help the species recover have no clear direction

forward, because the threats described in the revised proposed rule are not assigned any values and often are inconsistent with one another. The commenter claimed that many of these identified threats are competing in nature. For example, the commenter stated that severe-wildfire can often be prevented by proper vegetation management. Similarly, the commenter stated that vegetation management can help prevent losses due to forest insects and tree diseases by preventing widespread loss of forest vegetation.

Our Response: Threats acting on the fisher are complex and interact with each other such that some threats can influence how other threats act on the fisher. These influences can be either positive (e.g., appropriate vegetation management that may reduce forest vulnerability to large-scale tree diseases or insect outbreaks) or negative (e.g., climate change influencing the potential for high-severity wildfires). In this context of competing threat influences, the commenter further suggests the need to provide a direction forward for those attempting to recover listed species, as threats are not assigned any "values." While we do not assign values to threats when conducting a status assessment for a species, we identify those threats that may have the most significant impacts to the species' viability. However, we also note that efforts to recover a species, once determined it warrants listing, are subsequently developed in light of all the identified threats, where they occur within the species' range, and how they interact with each other and the species and its environment. Recovery actions may therefore be location- or habitat-specific, and address the competing nature noted by the commenter.

Threatened vs. Endangered

(64) Comment: Several commenters urged the Service to list the proposed West Coast DPS of fisher as either endangered or threatened, or urged listing without specifying which status is most appropriate. In contrast, several other commenters urged the Service not to list the taxon. Some comments urging the Service to not list the DPS are either focused on not listing specifically in the State of Oregon or not listing the NCSO subpopulation. All of these comments with varied opinions are similar in content and rationales to those received on the 2014 Proposed Rule.

Our Response: Sections 3(6) and 3(20) of the Act, respectively, define an endangered species as one that is in danger of extinction throughout all or a significant portion of its range, and a threatened species as one that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Our task in evaluating a species for a potential listing under the Act is to determine whether that species meets the definition of either a threatened species or an endangered species, based solely on the best scientific and commercial data available. For this reason, comments merely expressing support for or opposition to a proposed listing, without supporting scientific rationale or data, do not meet the standard of information required by section 4(b)(1)(A) of the Act. There is significant information available on fishers and their habitat in the West Coast States; we note there could always be more data for most analyses to help lessen uncertainties.

The determination for the NCSO DPS is that listing is not warranted. Regarding the SSN DPS, at this time the best available scientific and commercial information suggests that the cumulative impact of the stressors adversely affecting the SSN DPS of fisher is such that listing the SSN DPS of fisher as an endangered species is appropriate. Of greatest concern at this time are stressors related to illegal rodenticide use, increasing high-severity wildfires, and prolonged droughts that exacerbate the effects from wildfire, forest insects, and tree disease. For all of these reasons and as detailed in the **Determination** section of this document, we conclude that the SSN DPS of fisher meets the definition of an endangered species under the Act.

(65) Comment: Two commenters urged the Service to list the NCSO subpopulation as a threatened species and SSN subpopulation as an endangered species, the latter because they believe protections for this small, isolated subpopulation are insufficient to prevent its extinction and threats are more immediate (e.g., high severity wildfires and drought within its narrow range have increased in recent years).

Our Response: Please see our response to *Comment 14 and Comments 64*, and the analysis for each DPS contained in this document.

(66) Comment: One commenter stated that the Rogue-River and Siskiyou area, where the Ashland fisher population resides, is recognized as a rich environment of floristic biodiversity. The commenter stated that habitat characteristics deemed important for fishers are equally critical for smaller mammals and birds that rely on similar, if not exact, habitat requirements, and that species of special concern that also cohabit this region, such as the Northern Spotted owl, the Humboldt marten, and the Northern flying squirrel, would certainly benefit from the overarching protection of fisher resources that this listing could provide. Further, the commenter claimed that protection of habitat characteristics for both predator and prey species would retain an ecological balance important to the functionality of forest health and successional stages (e.g., insect population control and seed dispersal roles by mammalian and avian species).

Our Response: We cannot base our listing decision on the benefits of habitat protection to other plants and animals. Section 4(a)(1) of the Act directs us to, "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." We recognize the ecological value of the Rogue River and Siskiyou area, as well as its contribution to fishers and other plants and animals. However, this information did not contribute to our overall determinations on the status of the fisher.

Tree Mortality

(67) Comment: One commenter expressed concern that canopy cover loss from tree mortality will increase fragmentation and reduce female fisher gene flow. The commenter claimed that tree mortality is resulting in extensive management along road corridors, which may further impede connectivity.

Our Response: We discussed the best available science regarding tree mortality in both the NCSO DPS and SSN DPS of this final rule.

Vegetation Management

(68) Comment: One commenter stated that the revised proposed rule fails to justify wildfire suppression and vegetation management activities as threats. The commenter asserted that the

Service should evaluate the benefits associated with these activities, including the decreased risk of severe wildfire when vegetation is managed appropriately.

Our Response: Fishers use managed landscapes, particularly when key elements such as den and rest trees are retained and when forest heterogeneity is promoted (see Vegetation Management). There can be benefits associated with vegetation management including decreased risk of wildfire; however, there are potential trade-offs to these activities (e.g., loss of fisher habitat to reduce wildfire risk in fisher habitat), which should be weighed carefully when implementing such actions.

(69) Comment: One commenter claimed that wildfire mitigation activities, which can include vegetation management, can be effective in long-term preservation of fisher habitat. Meanwhile, the commenter pointed out that other Federal agencies, such as the Forest Service, have recognized that active forest management is necessary to address threats from widespread tree mortality. Overall, the commenter asserted that the Service failed to acknowledge the beneficial effects on fisher habitat associated with forest and fuels management.

Our Response: We acknowledge the benefit of carefully applied fuels reduction strategies in reducing wildfire risk while also retaining fisher habitat structural elements in the final Species Report (Service 2016, pp. 60, 68-69). We further acknowledge in this rule conservation measures designed to reduce fire risk while also retaining fisher habitat structural elements.

(70) Comment: One commenter stated that the Service provides no analysis or supporting citations for its conclusory statements that removal of "snags and other large habitat structures" for safety reasons is a threat to the DPS.

Our Response: For clarification purposes, 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, including alteration of habitat or required resources. Because the fisher uses snags and large trees for resting and denning, their removal would have a negative effect on the species and is, by this definition, a threat. However, the mere identification of a threat does not necessarily mean that the species meets the statutory definition of an endangered or threatened species. For both DPSs, we weighed the cumulative effects of the threats, along with existing conservation measures, to make our determination.

(71) Comment: One commenter stated that over the last 5 years, a variety of logging projects within the fisher's range have degraded habitat. The commenter claimed that if current trajectories continue, we can expect to see more habitat loss through logging.

Our Response: We recognize that timber harvest is and will continue to be an ongoing activity within the fisher DPSs. However, it affects a small portion of conditions used by fishers (as represented by the OGSI-80 condition in the NCSO DPS). For the NCSO DPS, we concluded that timber harvest (vegetation management), combined with other analyzed threats and the existing population condition, are not acting on the DPS to the degree that it meets the definition of endangered or threatened under the Act. Conversely, for the SSN DPS we concluded that timber harvest (vegetation management), combined with other analyzed threats and the existing population condition, are such that the DPS meets the definition of endangered under the Act.

(72) Comment: One commenter observed that the proposed rule discusses the effects of fire on fisher habitat and the extended time to recover habitat features. The commenter stated that timber harvest on Federal lands under existing management plans allows the removal of live and dead woody features that are important components of denning habitat. Furthermore, the commenter asserted that timber harvest does not provide the same ecological effects of fire, also noting that timber harvest, as currently practiced by the Forest Service and BLM, can remove and downgrade fisher habitat.

Our Response: In this rule and in the final Species Report (Service 2016, pp. 60-77, 98-111) we acknowledge the wide variety of effects on fisher habitat as a result of wildfire and vegetation management, as well as the different ecological effects of fire vs. vegetation management. We also recognize that timber harvest on Federal lands has, and will continue to remove fisher habitat and have factored that into our decision, concluding that it results in removal of a small portion of fisher habitat.

*(73) Comment***:** One commenter stated that the Service is inconsistent with our handling of vegetation management as a tool to reduce the risk of large-scale, high-severity wildfire. The commenter noted that we conclude it is a threat to fisher in the proposed rule, yet in the recent finding for the California spotted owl, the Service concluded that vegetation management was necessary to reduce the overall potential for wildfires to be detrimental to California spotted owl habitat and ultimately concluded that the owl did not warrant listing.

Our Response: The Service relied on conservation efforts to reduce large-scale high severity fires within the range of California spotted owl that included specific measures to identify the greatest risks to known occupied California spotted owl activity centers, and prioritize fuels reduction work that helps to protect the greatest number of activity centers on Federal and private lands while not reducing quality of the highest quality owl habitat in treated areas. While these California spotted owl conservation measures benefit fisher, they do not explicitly describe how implementation will benefit fisher. Since the 2019 Revised Proposed Rule, we received new MOUs designed to reduce high severity wildfire that include specific conservation measures to protect fisher habitat within the NCSO DPS. We have incorporated this new information into our analysis.

(74) Comment: One commenter stated that the Service acknowledges in the 2019 Revised Proposed Rule that it has no basis to conclude that fuels reduction, restoration thinning, or indeed any other management activity is a threat to the DPS; there is no information on how different vegetation management activities affect fisher subpopulations and their persistence within the DPS's range. The commenter also claimed that the Service proceeds to conclude that some forms of vegetative management, without specifying which kinds, "may threaten fisher." The commenter asserted that, based on this slim reed, the Service then identified vegetative management as a threat to the species, specifically including fuels reduction and restoration thinning.

Our Response: As noted in our analyses, a wide range of activities fall under the broad term, "vegetation management." Thus, fisher response to vegetation management activities can vary, depending on the type of activity and its duration and magnitude (Service 2016,, p. 110; see Vegetation Management section). Our analysis of the effects of vegetation management (changes in OGSI-80 stands or in and GNN analyses; actual loss of fisher habitat within the SSN) is somewhat driven by the features measured in the data sets we used. That is, in the case of OGSI-80 stands, activities that reduce canopy cover to below 10 percent or remove large structural elements would be recorded as a reduction in that stand condition. Such activities may include clearcuts and some fuels reduction activities, but likely not thinning activities. Hence, our analysis focuses on those vegetation management activities that likely have the greatest effect on fishers in terms of removing canopy cover or structural elements. These types of vegetation management activities seem to have the greatest effect on fishers, although portion of the DPS' affected by vegetation management is small.

Wildfire

(75) Comment: One commenter stated that the duration of impact from high-severity wildfire is not adequately addressed. In particular, the commenter claimed that the Service assumes that habitat lost to high-severity wildfire is permanent, and therefore does not consider effects into the foreseeable future. The commenter specifically stated that we failed to consider fisher re-occupancy of the 1992 Fountain Fire, which was salvage logged with little retention of structures used by fisher.

Our Response: The Wildfire and Wildfire Suppression section of this rule and the 2016 final Species Report (Service 2016, pp. 62-66, 77) include discussions of short- and long-term effects of wildfire on fisher habitat. Further, the 2016 final Species Report includes a discussion of fisher re-occupancy of the 1992 Fountain Fire area (Service 2016, p. 66). Neither the 2019 Revised Proposed Rule, this final rule, nor the 2016 final Species Report assumes that habitat loss as a result of high-severity fire is permanent. The 2019 Revised Proposed Rule and this final rule also consider vegetation ingrowth (see Vegetation Management, above) and its ability to represent trends in forest structural conditions used by fishers. Therefore, we have already determined that habitat affected by fire is not permanent and that fishers may re-occupy burned areas in the foreseeable future.

(76) Comment: One commenter stated that the revised proposed rule does not make a conclusive statement regarding the degree to which wildfire threatens fisher. The commenter cites Powell *et al.* (2019, pp. 23–27) and examples of fisher reoccupying burned areas (e.g., Fountain Fire) as a reason to reconsider the threat of extinction from wildfire within the foreseeable future. Specific to Powell *et al.* (2019), the commenter claimed that extinction risk for fisher did not exceed 0.25 unless over 40 percent of the simulated area burned, with a decrease in risk when SPI management was included. Thus, the commenter asserted there is a low risk of extinction when modeled at a high rate of short-term, high-intensity habitat loss. Lacking any analysis, the commenter believed the conclusion should be that the reported rate of loss of habitat (7 percent over 10 years; citing 84 FR 60278, p. 60288) is not likely to lead to endangered status in the foreseeable future.

Our Response: Contrary to the comment, the 2019 Revised Proposed Rule and this final rule include statements regarding the degree of impacts of wildfire on fisher, at the species level and for both subpopulations (see Wildfire and Wildfire Suppression). As we explain, the impacts are highly variable and depend on forest type, landscape location, size, and intensity of the wildfire. The conclusions reached by the commenter regarding data in Powell et al. (2019, pp. 23-27) appear to be extrapolations of data presented in figure 16 (Powell et al. 2019, p. 26). We acknowledge the point the commenter brings forward, but also note the model used by Powell et al. 2019 and the data used to determine the loss of habitat at 7 percent per year are different. As we describe in Wildfire and Wildfire Suppression above, our analysis addressed potential habitat loss from wildfires. The analysis completed by Powell et al. 2019 (entire) more generally addresses area burned rather than the potential fisher habitat loss within that area. Therefore, these two methods are not directly comparable.

(77) Comment: Multiple commenters indicated that we did not analyze the impact of fuel breaks and fuel reduction projects occurring under MOUs for the northern spotted owl and the California spotted owl across Federal, state, and private ownerships.

Our Response: The final rule includes an updated discussion of the MOUs (see Existing Regulatory Mechanisms and Voluntary Conservation Measures) suggested by the commenter. In summary, the MOUs have not been in place very long; therefore, it is difficult to understand their effectiveness and subsequently their actual benefits to fishers and their habitat. However, we view these MOUs as important collaboration tools that can achieve the conservation needs of the fisher across large landscapes. We will continue to monitor these efforts into the future.

(78) Comment: One commenter is concerned that entire populations and sub-populations of fisher could be eliminated by stochastic wildfire events unless steps are taken to increase protections. Two other commenters are similarly concerned that climate-related factors are

predicted to increase wildfire activity; thus, the commenters stated that forest management is a necessary tool to minimize the impacts and spread of wildfire.

Our Response: We agree that the impacts of wildfire are a significant concern for fisher (see Wildfire and Wildfire Suppression section of this rule). We are optimistic that actions implemented under voluntary conservation measures (e.g., MOUs, CCAAs, HCPs; see Existing Regulatory Mechanisms and Voluntary Conservation Measures section of this rule), including forest management will provide protection of fisher habitat in the near and long term.

(79) Comment: One commenter stated that the analysis of wildfire was not thoroughly evaluated. Specifically, the commenter raised concerns about the Service's use of OGSI-80 to determine a less than 1 percent loss of habitat per decade from wildfire and an analysis conducted by the Service that showed a 7 percent of high and intermediate fisher habitat loss to wildfire since 2008.

Our Response: We have revised our discussion of wildfire threats to clarify the distinction between the Davis *et al.* (2015, entire) analysis of loss of OGSI-80 forest to wildfire and the analysis done by use to more directly assess fisher habitat loss to wildfire. Please see our response to comments above and the Wildfire and Wildfire Suppression section of this rule.

Required Determinations

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

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the Federal Register on October 25, 1983 (48 FR 49244).

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), Executive Order 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 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. In development of the 2014 Species Report, we sent letters noting our intent to conduct a status review and requested information from all tribal entities within the historical range of the West Coast DPS of fisher, and we provided the draft Species Report to those tribes for review. We also notified the tribes via e-mail to ensure they were aware of the January 31, 2019, document in the Federal Register to reopen the comment period on the October 7, 2014, proposed rule to list the DPS as a threatened species. As we move forward in this listing process, we will continue to consult on a government-to-government basis with tribes as necessary.

References Cited

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

Authors

The primary authors of this proposed rule are the staff members of the Unified Interior's California-Great Basin Regional Office.

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

Accordingly, we 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. Amend part 17.11(h) by adding an entry for "Fisher (Southern Sierra Nevada DPS)" in alphabetical order under Mammals to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

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(h) * * *

Common name	Scientific name	Where Listed	Status	Listing Citations and Applicable Rules
Mammals				
* * * * * * *				
Fisher (Southern Sierra Nevada DPS)	Pekania pennanti	U.S.A. (Southern Sierra Nevada, CA)	T	[Federal Register citation when published as a final rule];
* * * * * * *				

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Dated: ____.

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Director, U.S. Fish and Wildlife Service.

~~[Endangered and Threatened Wildlife and Plants; Threatened Species Status for West Coast Distinct Population Segment of Fisher With Section 4(d) Rule]~~