

**DEPARTMENT OF THE INTERIOR****Fish and Wildlife Service****50 CFR Part 17**

[Docket No. FWS-R6-ES-2023-0216;  
FF09E21000 FXES1111090000 245]

RIN 1018-BH27

**Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for North American Wolverine**

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

**ACTION:** Final rule and interim rule with request for comments.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine threatened species status under the Endangered Species Act of 1973 (Act), as amended, for the distinct population segment (DPS) of the North American wolverine (*Gulo gulo luscus*) occurring in the contiguous United States. This rule adds the contiguous U.S. DPS of the North American wolverine to the Federal List of Endangered and Threatened Wildlife. We are also issuing an interim rule under the authority of section 4(d) of the Act (an “interim 4(d) rule”) that provides the prohibitions, and exceptions to those prohibitions, necessary and advisable for the conservation of the contiguous U.S. DPS of the North American wolverine.

**DATES:**

*Effective date:* This rule is effective January 2, 2024.

*Comments due:* Comments on the interim 4(d) rule must be received or postmarked by January 29, 2024.

**ADDRESSES:**

*Written comments on the interim 4(d) rule:* You may submit comments on the interim 4(d) rule by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: <https://www.regulations.gov>. In the Search box, enter FWS-R6-ES-2023-0216, which is the docket number for this rulemaking. Then click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, click on the Rules box to locate this document. You may submit a comment by clicking on “Comment.”

(2) *By hard copy:* U.S. mail: Public Comments Processing, Attn: FWS-R6-ES-2023-0216; U.S. Fish and Wildlife Service; MS: PRB/3W; 5275 Leesburg Pike; Falls Church, VA 22041-3803.

We will post all comments on <https://www.regulations.gov>. This generally means that we will post any personal

information you provide us (see Public Comments Solicited on the Interim 4(d) Rule, below, for more information).

*Availability of supporting materials:* This document is available on the internet at <https://www.regulations.gov> and at <https://ecos.fws.gov/ecp/species/5123>. Supporting materials we used in preparing this rule, including the 2018 species status assessment (SSA) report and the 2023 addendum to the SSA report, are available on the Service’s website at <https://ecos.fws.gov/ecp/species/5123>, at <https://www.regulations.gov> at Docket No. FWS-R6-ES-2023-0216, or both.

**FOR FURTHER INFORMATION CONTACT:** Jodi Bush, U.S. Fish and Wildlife Service, Pacific Region, 911 NE 11th Ave., Portland, OR 97232; telephone: (503) 231-6131. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

**SUPPLEMENTARY INFORMATION:****Executive Summary***Final Rule To List the Contiguous U.S. DPS of the North American Wolverine*

*Why we need to publish a rule.* The Act (16 U.S.C. 1531 *et seq.*) defines “species” as any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate fish or wildlife which interbreeds when mature. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species’ critical habitat to the maximum extent prudent and determinable. We have determined that the DPS of the North American wolverine occurring in the contiguous United States (the “contiguous U.S. DPS”) meets the Act’s definition of a threatened species; therefore, we are listing it as such. Listing a species as an endangered or threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

*What this document does.* This document is both (1) a final rule listing the contiguous U.S. DPS of the North American wolverine as a threatened species under the Act; and (2) an interim rule issued under the authority of section 4(d) of the Act (an “interim 4(d) rule”) providing the prohibitions, and exceptions to those prohibitions, that are necessary and advisable to provide for the conservation of the contiguous U.S. DPS of the North American wolverine.

*The basis for our action.* Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the contiguous U.S. DPS of the North American wolverine is a threatened species due primarily to the ongoing and increasing impacts of climate change and associated habitat degradation and fragmentation.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. We have not yet obtained the necessary economic information needed to develop a proposed critical habitat designation for the contiguous U.S. DPS of the North American wolverine. Therefore, we find that designation of critical habitat for the DPS is currently not determinable.

*Interim 4(d) Rule*

*The need for the regulatory action and how the action will meet that need.* Consistent with section 4(d) of the Act, this interim 4(d) rule provides measures that are tailored to our current understanding of the conservation needs of the North American wolverine.

Under section 4(d) of the Act, the Secretary of the Interior has discretion to issue such regulations as she deems necessary and advisable to provide for the conservation of the species. The Secretary also has the discretion to prohibit by regulation with respect to a threatened species, any act prohibited by section 9(a)(1) of the Act.

*Summary of the major provisions of the regulatory action.* This interim 4(d) rule will provide for the conservation of the contiguous U.S. DPS of the North American wolverine by prohibiting the following activities, unless they fall

within the specific identified exceptions or are otherwise authorized or permitted: importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, carrying, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce.

The interim 4(d) rule will also provide for the conservation of the species by allowing exceptions to the general prohibitions against “take” of the species in support of conservation actions and otherwise lawful activities that could take wolverines but at minimal levels not likely to have a negative impact on the species’ conservation. The exceptions include take due to scientific research conducted on wolverines by a Federal or Tribal biologist in the course of their official duties, incidental take resulting from forest management activities for the purposes of reducing the risk or severity of wildfire, and incidental take resulting from legal trapping conducted consistent with State and Tribal trapping rules or guidelines that contain steps to minimize the potential for capture of wolverine.

#### Supporting Documents

A team prepared a species status assessment (SSA) for the North American wolverine (*Gulo gulo luscus*) (Service 2018, entire) (hereafter referred to as the wolverine SSA report). The SSA team was composed of U.S. Fish and Wildlife Service (Service) biologists, who consulted with other species experts. The wolverine SSA report represented a compilation of the best scientific and commercial data available (known at that time) concerning the status of the North American wolverine, including the impacts of past, present, and future factors (both negative and beneficial) affecting the wolverine. The wolverine SSA report underwent independent peer review by scientists with experience with mesocarnivores and their conservation and management, genetics, population modeling, and climate change.

More recently, the Service prepared an SSA addendum for the North American wolverine (*Gulo gulo luscus*) (Service 2023, entire) (hereafter referred to as the wolverine SSA report addendum). The wolverine SSA report addendum contains a synthesis of relevant new information that has become available since the 2018 wolverine SSA report. The wolverine SSA report addendum underwent independent peer review by scientists

with experience with mesocarnivores and their conservation and management, genetics, population modeling, and climate change. The wolverine SSA report addendum also underwent technical review by State, Federal, and Tribal biologists.

The wolverine SSA report, the wolverine SSA report addendum, and other materials relating to this rulemaking can be found at the Service’s website at <https://ecos.fws.gov/ecp/species/5123>, and at <https://www.regulations.gov> at Docket No. FWS–R6–ES–2023–0216.

#### Previous Federal Actions

On February 4, 2013, we published in the **Federal Register** (78 FR 7864) a proposed rule to list the DPS of the North American wolverine occurring in the contiguous United States as a threatened species under the Act, with a proposed rule under section 4(d) of the Act that outlined the prohibitions, and exceptions to those prohibitions, necessary and advisable for the conservation of the wolverine. Please refer to that February 4, 2013, proposed rule (78 FR 7864) for a detailed description of previous Federal actions concerning the wolverine prior to 2013. We published a separate proposed rule in the **Federal Register** on February 4, 2013 (78 FR 7890), to establish a nonessential experimental population (NEP) area for the North American wolverine in the Southern Rocky Mountains of Colorado, northern New Mexico, and southern Wyoming. On October 31, 2013, we reopened the comment period on the proposed listing rule for an additional 30 days (78 FR 65248).

Following publication of the 2013 proposed rules, there was scientific disagreement and debate about the interpretation of the habitat requirements for wolverines and available climate change information used to determine the extent of threats to the contiguous U.S. DPS of the North American wolverine. Based on this substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the proposed listing, on February 5, 2014, we announced in the **Federal Register** (79 FR 6874) a 6-month extension of the final determination of whether to list the contiguous U.S. DPS of North American wolverine as a threatened species under the Act. That document reopened the comment period on the February 4, 2013, proposed listing rule for an additional 90 days.

On August 13, 2014, we published in the **Federal Register** (79 FR 47522) a document withdrawing both proposed

rules published on February 4, 2013: (1) the proposed rule to list the contiguous U.S. DPS of the North American wolverine as a threatened species under the Act, including the provisions proposed under section 4(d) of the Act; and (2) the proposed NEP designation under section 10(j) of the Act for the North American wolverine in the Southern Rocky Mountains of Colorado, northern New Mexico, and southern Wyoming. These withdrawals were based on our conclusion that the factors affecting the DPS as identified in the listing proposed rule were not as significant as believed at the time of that proposed rule’s publication in 2013.

In October 2014, three complaints were filed in the District Court for the District of Montana by Defenders of Wildlife, WildEarth Guardians, Center for Biological Diversity, and other organizations challenging the withdrawal of the February 4, 2013, proposed rule to list the contiguous U.S. DPS of the North American wolverine. Numerous parties intervened in the litigation. These three cases were consolidated, and on April 4, 2016, the court issued a decision. The court granted plaintiffs’ motion for summary judgment with respect to the Service’s determination regarding (1) the threat posed to the wolverine by the effects of climate change at the reproductive denning scale, (2) the threat posed to the wolverine by small population size and lack of genetic diversity, and (3) the application of the significant portion of the range policy to the wolverine. As a result of the court order, the August 13, 2014, withdrawal (79 FR 47522) of the February 4, 2013, proposed listing rule was vacated and remanded to the Service for further consideration consistent with the order.

In effect, the court’s action returned the process to the proposed rule stage, and the status of the contiguous U.S. DPS of the North American wolverine under the Act reverted to that of a proposed species for the purposes of consultation under section 7 of the Act. On October 18, 2016, we published in the **Federal Register** (81 FR 71670) a document reopening the comment period on the February 4, 2013, proposed rule to list the DPS of the North American wolverine occurring in the contiguous United States as threatened under the Act (78 FR 7864). The October 18, 2016, publication also requested new information and announced that we were initiating a new and comprehensive status review of the North American wolverine, to determine whether the species meets the definition of an endangered or threatened species under the Act, or

whether the species is not warranted for listing. Both new and updated information and analyses presented in the wolverine 2018 SSA report, along with public comments, prompted us to reevaluate our previous assessment of the DPS (presented in our 2013 proposed listing rule (78 FR 7864), which in turn relied on the DPS analysis completed in our 2010 12-month finding (75 FR 78030)) with respect to the North American wolverine in the contiguous United States.

On October 13, 2020, we published in the **Federal Register** (85 FR 64618) another document withdrawing the February 4, 2013, proposed rule to list the DPS of the North American wolverine occurring in the contiguous United States as threatened under the Act. Our 2020 withdrawal decision was based on our conclusion that the factors affecting the North American wolverine occurring in the contiguous United States as identified in the 2013 proposed listing rule were not as significant as believed at the time of the proposed rule's publication in 2013. We also found that the North American wolverines occurring in the contiguous United States did not qualify as a DPS.

The Center for Biological Diversity and WildEarth Guardians filed lawsuits in the District Court for the District of Montana challenging the Service's 2020 decision to withdraw the February 4, 2013, proposal to list the contiguous U.S. DPS of the North American wolverine. The cases were consolidated, and the State of Idaho's motion to intervene was granted. On February 4, 2022, the Service filed a motion asking the court to voluntarily return (remand) the 2020 withdrawal decision to the Service to allow the Service to re-examine the decision in light of the intervening decision in *Center for Biological Diversity v. Haaland*, 998 F.3d 1061 (9th Cir. 2021) ("Pacific Walrus Decision") and to reevaluate the decision in light of new scientific information that had become available since the completion of the 2018 SSA. The Service also requested that the 2020 withdrawal decision remain in effect pending that reevaluation. On May 26, 2022, the court granted the Service's request for a voluntary remand of the 2020 withdrawal decision, but the court decided to vacate the withdrawal decision (*Ctr. for Biological Diversity v. Haaland*, No. CV 20–181–M–DWM (D. Mont. May 26, 2022)).

The court's May 26, 2022, action returned the listing process for the North American wolverine to the proposed rule stage. On November 23, 2022, the Service published in the **Federal Register** (87 FR 71557) a

document soliciting new information on the North American wolverine and notifying the public that the February 4, 2013, proposed rule to list the contiguous U.S. DPS of the North American wolverine as threatened under the Act (78 FR 7864) had been reinstated. As of May 26, 2022, for purposes of consultation under section 7 of the Act, the North American wolverine was again a species proposed for listing and subject to conferencing requirements.

The Service then completed the wolverine SSA report addendum (Service 2023, entire), which contains a synthesis of all relevant new information that has become available since the 2018 wolverine SSA report to inform this final listing rule and the associated interim 4(d) rule.

#### Peer Review

Our assessment of the status of the North American wolverine contained in this document is supported by information in both the 2018 SSA report (Service 2018, entire) and the 2023 wolverine SSA report addendum (Service 2023, entire). In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review in listing actions under the Act, we solicited independent scientific review of the information contained in the 2018 wolverine SSA report. We sent the SSA report to four independent peer reviewers and received four responses; we incorporated the results of that review into the SSA report, as appropriate. More recently, we solicited independent scientific review of the 2023 wolverine SSA report addendum. We sent the wolverine SSA report addendum to six peer reviewers and received three responses; we incorporated the results of the peer review into the wolverine SSA report addendum, as appropriate. The peer reviews on the wolverine SSA report and the wolverine SSA report addendum can be found at <https://www.regulations.gov>.

#### Summary of Changes

Since the publication of the February 4, 2013, proposed listing rule (78 FR 7864), the development of the 2018 SSA report (Service 2018, entire), and the publication of the October 13, 2020, withdrawal document (85 FR 64618), a substantial number of new studies have become available, refining our understanding of wolverine biology and threats affecting North American wolverines in the contiguous United

States. We incorporated this new information into the 2023 wolverine SSA report addendum. We summarize the information most salient to our determination in this final rule below. We also discuss these changes where appropriate in the remainder of the document to provide further detail and context.

#### Ecological Requirements

The snow model used in the climate change analysis in the 2018 SSA report and October 13, 2020, withdrawal document (85 FR 64618) projected snow loss out to year 2050 in only two modeling domains (Glacier National Park and the central Rocky Mountains) (Service 2018, p. 88). Results indicated a decline in spring snow in these areas due to climate change was likely, but we were unable to extrapolate those projections across the remainder of the North American wolverine's breeding range in the contiguous United States. Persistent spring snow (greater than or equal to 1 meter on May 1; see *Climate Change*, below) was not identified as an ecological requirement for wolverines, and we assumed that if snow was necessary for denning, there would be enough spring snowpack in the future to fulfill denning needs.

Our updated climate analysis reported in the 2023 wolverine SSA report addendum projects snow loss out to 2100 across five modeling domains that cover a much larger extent of the breeding range in the contiguous United States when compared to the 2018 SSA report. In our 2023 wolverine SSA report addendum, we found declines in spring snow due to climate change are likely across the North American wolverine's range and predicted losses will be greater in 2100 than in 2050. In general, when compared to historical amounts of snow cover, nearly every area modeled (except for the Mid-Rockies) sees a decrease in snow cover and that decrease becomes larger over time. In the Mid-Rockies, snow cover increases in the short term, but as with the other areas, it decreases over time.

New research indicates that areas characterized by persistent spring snow are likely important for wolverine survival (*e.g.*, caching food) in addition to denning and reproduction. One new study reported wolverines cache food year-round, indicating that warmer temperatures could impact the ability of wolverines to store food resources by decreasing the shelf-life (usability) of cached food, and increasing competition from pilferers that benefit from a warmer climate (van der Veen et al. 2020, p. 1). Another study found evidence to support a functional

relationship between North American wolverines and persistent spring snow that could be explained by the distribution of food, disturbance, or mortality risk (Kortello et al. 2019, p. 8).

#### *Connectivity With Canada*

Connectivity with Canada is essential to the long-term viability of North American wolverines in the contiguous United States (Cegelski et al. 2006, p. 209). In the 2018 SSA report and October 13, 2020, withdrawal document (85 FR 64618), we assumed that wolverines could move freely between Canada and the United States (Service 2018, p. 104). We also concluded that trapping of wolverines did not represent a barrier to wolverine movement and dispersal along the international border (Service 2018, p. 69). Additionally, we concluded that major highways did not represent a barrier to wolverine movement (Service 2018, p. 60).

In the 2023 wolverine SSA report addendum, we affirm that connectivity with Canada is essential to the long-term viability of North American wolverines in the lower 48 States. However, our understanding of the ability of wolverines to move between Canada and the United States in the Rocky Mountains has changed. New research found an estimated 41 percent decline in the wolverine population from 2011–2020 in a portion (7,583,417 acres (ac) (30,689 square kilometers (km<sup>2</sup>))) of the southern Canadian Rockies, Purcell Mountains, and Selkirk Mountains important for wolverine connectivity with the United States; this decline could be attributed to one or more of the following causes: trapping, backcountry recreation, human development, and food availability (Barrueto et al. 2022, p. 4). In addition, new transboundary genetic research indicates the Trans-Canada Highway in southern British Columbia is impeding female dispersal from Canada to the United States, thereby limiting gene flow and the ability of dispersing wolverines to supplement the contiguous U.S. DPS (Sawaya et al. 2023, pp. 12, 17).

#### *Genetic Diversity and Adaptive Capacity*

In the October 13, 2020, withdrawal document (85 FR 64618), we found there was no available information to indicate that the current abundance of the North American wolverine across its range in the contiguous United States was at a level that was causing inbreeding depression or loss of genetic variation that would affect its ability to adapt to changing conditions.

New transboundary genetic research shows a sharp decline in genetic

diversity and increasing population fragmentation at the southern extent of the North American wolverine's range in western North America (Sawaya et al. 2023, p. 17). As a result, there is potential for inbreeding given the relatively small population sizes and low levels of genetic diversity of wolverines in the contiguous United States, especially in the Cascade Mountains of Washington and southern British Columbia (Sawaya 2023, pers. comm.); however, inbreeding depression has not been observed. New analysis of the North American wolverine's adaptive capacity shows that their specialized habitat associations, low genetic diversity and population size, narrow ecological niche, low tolerance for human disturbance, and slow reproductive rate all contribute to the wolverine's relative difficulty in adapting in-place to future environmental change (Service 2023, p. 66).

#### *Roads and Development*

We analyzed the effects of roads and development (human disturbance) to North American wolverines in the 2018 SSA report (Service 2018, p. 62) and determined in our October 13, 2020, withdrawal document (85 FR 64618) that impacts to wolverines are small and narrow in scope and scale. We did not consider roads and development to be an impediment to wolverine movement and gene flow.

New habitat and landscape genetic research indicates multi-lane roads and human development in valley bottoms between core habitats may limit dispersal and population connectivity to some extent, especially for female wolverines. Connectivity among wolverine habitats appears to be particularly sensitive to housing developments (Balkenhol et al. 2020, p. 797). Also, new research indicates that human disturbance (road density) and food availability are major drivers of wolverine distribution in winter (Kortello et al. 2019, p. 1). Wolverine density and detection probability declined in areas with more human development (Barrueto et al. 2022, p. 4). Human development may also have cascading impacts of increasing competition from other mesocarnivores that are less affected by human disturbance (Frey et al. 2020, pp. 1136–1138; Chow-Fraser et al. 2022, p. 6; Milanese et al. 2022, pp. 10–11).

#### *Winter Recreation*

In our 2018 SSA report and October 13, 2020, withdrawal document (85 FR 64618), we concluded that winter recreation is a low-level stressor for

wolverines in the contiguous United States (Service 2018, p. 62). The limited research available at the time indicated some avoidance behavior exhibited by wolverines in areas with backcountry winter recreation, but not to the extent that we had concerns about population-level impacts.

In the 2023 wolverine SSA report addendum, we provide an updated assessment of the effects of winter recreation based on new studies. Research indicates winter recreation is negatively associated with North American wolverine habitat use, and that winter recreation is likely to increase and become more concentrated in the future as snow-covered areas decline due to climate change (Heinemeyer et al. 2019, p. 1). A large multi-State analysis of winter recreation impacts in the Northern Rocky Mountains was published in 2019, indicating greater concern for impacts to wolverines than we found in 2018 and showing a negative functional response to the level of recreation exposure within their home ranges (Heinemeyer et al. 2019a, pp. 13–14, 17–18). Additionally, new research found an incremental loss of wolverines in portions of central Idaho where winter recreation impacts are increasing (Mack and Hagan 2022, p. 13). Furthermore, forest roads used by snowmobilers in the Canadian Rockies were found to have a strong negative correlation with wolverine distribution (Kortello et al. 2019, p. 10). Wolverine detection probability in protected and non-protected habitat of southwestern Canada was found to be strongly and negatively correlated with nonmotorized recreation in summer and winter (Barrueto et al. 2022, p. 5).

#### *Trapping*

In our 2018 SSA and the October 13, 2020, withdrawal document (85 FR 64618), we concluded that overutilization does not currently represent a stressor to the North American wolverine in the contiguous United States at the individual, population, or species level. We also concluded that trapping in Canada has been and appears to be sustainable, and trapping or harvesting of wolverines along the contiguous U.S.–Canada border does not represent a stressor to wolverines migrating into the contiguous United States and does not represent a barrier to wolverine movement and dispersal along the international border (Service 2018, p. 71).

Legal trapping of wolverines has not occurred in the contiguous United States in the past 10 years, and lethal

incidental trapping of wolverines has been minimal (Service 2023, p. 38). We expect recent changes to wolf trapping regulations in Idaho and Montana to have little effect on wolverines at a population level, as long as trapping is done in a manner to limit wolverine bycatch (Idaho Department of Fish and Game (IDFG) 2023, in litt., p. 1; IDFG 2022, p. 40; Montana Fish, Wildlife and Parks (MFWP) 2023, in litt., p. 1; MFWP 2022, entire). Below, under *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*, we provide an assessment of incidental trapping and the measures States are taking to reduce incidental trapping of wolverines.

Recent research on wolverine trapping in Southern Canada indicates that trapping may be having more of a negative effect on wolverine populations in Canada than previously thought (Kortello et al. 2019, pp. 1, 10; Mowat et al. 2020, entire; Barrueto et al. 2020, p. 296; Barrueto et al. 2022, entire). Unsustainable trapping levels in Canada could limit dispersal of individuals into the contiguous United States, where the dispersal of wolverines from Southern Canada is vital to the genetic and demographic health of the U.S. population (Sawaya 2023, pers. comm.).

### Summary of Comments and Recommendations

#### Comments on the 2013 Proposed Listing Rule

Upon publication of our February 4, 2013, proposed rule to list the DPS of North American wolverine occurring in the contiguous United States as a threatened species (78 FR 7864), we opened a 90-day public comment period, ending May 6, 2013. After we withdrew the proposed rule, on October 18, 2016 (81 FR 71670), we again opened a public comment period on our 2013 proposed listing rule; that comment period was open for 30 days, ending November 17, 2016. At both times, we contacted appropriate Federal and State agencies, scientific experts and organizations, Tribes, and other interested parties and invited them to comment on the 2013 proposed listing rule. Many of the comments we received from State agencies during our 2016 reopened comment period (81 FR 71670) were similar to those we received during the initial 2013 public comment period (78 FR 7864). All substantive information provided during both comment periods on our 2013 proposed listing rule has either been incorporated directly into this final determination or is addressed below.

Below, we present the comments received on the 2013 proposed listing rule and a summary of our responses as presented in the October 13, 2020, withdrawal document (85 FR 64618). We also provide updated responses to several of the comments based on new information presented in the 2023 wolverine SSA report addendum and this final rule. Comments are numbered below as they were numbered in the October 13, 2020, withdrawal document (85 FR 64618). Several of the comments and responses from the October 13, 2020, withdrawal document did not require revision, and they are incorporated here by reference; those comments with responses that remain the same are comments 6, 7, 9, 11, 13, 20, 21, 22, 23, and 24 (85 FR 64618 at 64622–64626).

#### Public Comments

(1) *Comment:* We received several public comments claiming that the North American wolverine faces increasing threats from the effects of climate change, particularly habitat loss due to declining snowpack.

*Our 2020 Response Summarized:* Our climate assessment in the 2018 wolverine SSA report and October 13, 2020, withdrawal document focused on the impact of climate change to denning conditions for wolverines. We stated we recognize that current climate trends and future (2055 and later) climate model projections indicate warming temperatures for much of western North America and changes to snow-pack conditions. In general, models indicate higher elevations, where documented historical wolverine denning has occurred, will retain more snow cover than lower elevations, particularly in early spring (on April 30/May 1). We referenced a climate analysis that included two regions, Glacier National Park and Rocky Mountain National Park. Details of this climate analysis are presented in Ray et al. (2017) and are summarized in the 2018 SSA report. Climate models in Ray et al. (2017) built upon previous model projections presented in McKelvey et al. (2011), but with significant differences such as finer spatial resolution, incorporation of slope and aspect, snow depth estimates, additional years of historical data, and wider temporal analyses of snow persistence (April–June). Model projections from Ray et al. (2017) indicate significant areas (several hundred square kilometers (km<sup>2</sup>)/square miles (mi<sup>2</sup>) for each study area) of future snow (greater than 0.5 meters (m) (20 inches (in)) in depth) are likely to persist on May 1 at elevations currently used by wolverines for denning. This is

true, on average, across the range of climate models used out to approximately year 2055.

*Our 2023 Response:* Our assessment of climate change impacts to North American wolverines in the 2023 wolverine SSA report addendum, and applied in this final rule, evaluates the impact of climate warming and changes in snowpack on various aspects of wolverine ecology, not just denning habitat (see *Climate Change*, below). We now consider habitats characterized by the presence of persistent spring snow for survival and reproduction to be a physical and ecological requirement for wolverines in the contiguous United States (see *Life-History Needs*, below). New evidence from around the world reinforces that snow—especially persistent spring snow—is an important predictor of broad-scale wolverine distribution and density (Aubry et al. 2023, pp. 15–16; Carroll et al. 2020, p. 8; Fisher et al. 2022, p. 10; Glass et al. 2021, entire; Mowat et al. 2020, p. 220). Snow cover appears to influence wolverine dispersal and resulting genetic structure (Balkenhol et al. 2020, pp. 798–799). Warming future conditions could make caching food more difficult for wolverines year-round (Van der Veen et al. 2020, pp. 8–10). Climate change also has the potential to exacerbate the impacts of other stressors, including effects from roads, winter recreational activity, development, low genetic diversity, and small populations (see *Threats*, below). Wolverines have denned outside of spring snowpack in the boreal forests of Canada and Scandinavia; however, the importance of spring snow for denning may vary among areas depending on the abundance of alternative den site structures, competitors, and food resources (Persson et al. 2023, p. 5810). Furthermore, there is no evidence that North American wolverines have denned in areas outside of spring snowpack in their alpine habitats in the contiguous United States. In light of this, we do not expect North American wolverines to continue to have the same or better resiliency in the contiguous United States in the future when cold and snowy conditions are expected to decrease, with spring snowpack decreasing as much as 50 percent in some areas. Although we are not seeing deleterious effects of climate change on the contiguous U.S. population of North American wolverines currently, we expect future impacts at the population level. For further detail, see the discussion under *Climate Change*, below.

(2) *Comment:* We received several public comments during our request for

information claiming that low population size (and small effective population size) warrant listing of the North American wolverine as threatened or endangered.

*Our 2020 Response Summarized:* We stated that wolverines are difficult animals to survey, and populations occur in naturally low densities across their North American range, due in large part to their need for large, exclusive territories. At that time (and still today), the only estimate of the number of wolverines that currently occupy the contiguous United States is the often-cited population estimate of 318 wolverines (range: 249–926) in the contiguous United States. This estimate was derived from habitat modeling presented in Inman et al. (2013). That publication also provided a modeled estimate of potential wolverine capacity in the contiguous United States of 644 wolverines (range: 506–1881). We also reported the preliminary results from the Western States Wolverine Conservation Project (WSWCP) occupancy study in four western States (Idaho, Montana, Washington, and Wyoming) and from a pilot occupancy study in Wyoming (2015–2016) (Service 2018, appendix B). Preliminary analysis of the study results indicated an average estimated probability of occupancy of 0.42, suggesting that wolverines used nearly half of all sites during the study period (MFWP 2017, pers. comm.). Although the sum of these reports cannot confirm the previous estimate of population size or verify population trends, they offer recent evidence that wolverines continue to be observed across a large area of the western United States.

We also discussed the estimated effective population size by Schwartz et al. (2009), which estimated a summed effective population size of 35, with credible limits from 28 to 52 (Schwartz et al. 2009, p. 3,226). We stated that the analysis missed two wolverine subpopulations as well as individuals, which would underestimate the results for this type of analysis. We went on to discuss the apparent connectivity between wolverines in the contiguous United States and Canada, and we considered the contiguous United States to be genetically continuous with wolverines in adjacent Canadian provinces. We concluded that a small effective population size would be more of a concern if the population was in isolation; however, wolverines in the contiguous United States are not genetically isolated from wolverines in Canada.

*Our 2023 Response:* The best available estimate of effective

population size for the wolverine in the Northern Rocky Mountains continues to be 35 (credible interval = 28–52) (Schwartz et al. 2009, p. 3,226). We estimated the effective population size of wolverines in the North Cascades to be four (Service 2023, p. 27). Overall, the effective population size estimates of wolverines in the contiguous United States are small compared to conservation guidelines, and the contiguous U.S. DPS of North American wolverines appear to be vulnerable to inbreeding and loss of genetic diversity when considered in isolation. However, only one or two effective migrants per generation (*i.e.*, the number of migrants that reproduce at the same rate as residents) are likely needed to achieve genetic population connectivity and maintain existing levels of genetic diversity (Cegelski et al. 2006, p. 209).

At the time we published the October 13, 2020, withdrawal document (85 FR 64618), we considered the contiguous U.S. population to be genetically continuous with Canada. We now know that wolverine populations in southern British Columbia and Alberta near the transboundary interface are less genetically connected to the contiguous United States than we found in our 2018 SSA. New information has revealed that female wolverines appear to avoid crossing major roadways, including the Trans-Canada Highway (Highway 1) and the Crownsnest Highway (Highway 3) in southern British Columbia (Sawaya et al. 2023, pp. 11–14). Substantially lower mitochondrial DNA diversity in the United States, as compared to mitochondrial DNA diversity in Canada, is consistent with the nuclear DNA signals of limited contemporary female gene flow between the countries and the wolverine's relatively recent recolonization at the southern edge of their range (Sawaya et al. 2023, p. 17). See "Gene Flow Between the United States and Canada" and "Population Structure and Gene Flow Within Canada," below, for more detail. Given the new information on limited gene flow with Canada and the potential impacts of climate change to future dispersal, the low effective population size in the contiguous U.S. population of North American wolverines is a concern to future population viability.

(3) *Comment:* We received several public comments during our request for information claiming that the North American wolverine faces threats from indiscriminate trapping in the contiguous United States, or are negatively impacted by incidental trapping.

*Our 2020 Response Summarized:* In our October 13, 2020, withdrawal

document (85 FR 64618), we stated that trapping or hunting of wolverines was not allowed in any State within the range of the wolverine in the contiguous United States, and we presented the legal protections afforded to wolverines in each State. We summarized what we knew at the time about incidental trapping. In the wolverine SSA report, we provided a summary of the number of wolverines that have been incidentally trapped in Idaho (18 since 1965, including 6 known to be released alive and 7 known mortalities), Montana (4 since 2013, 3 mortalities and 1 released unharmed), and Wyoming (2 since 1996, 1 mortality and 1 released unharmed) (Service 2018, p. 66). Both Idaho and Montana are implementing trapper education programs to minimize nontarget wolverine captures. We noted that regulated trapping and hunting of wolverines occurs in parts of Alaska and Canada, and appears to be sustainable based on population and density estimates.

*Our 2023 Response:* Legal trapping of wolverines has not occurred in the contiguous United States in the past 10 years. Wolverine trapping remains closed throughout the western United States, and wolverines have retained various protected status designations in the States within their current U.S. range (Service 2023, table 10). Therefore, legal direct trapping is no longer a stressor on wolverines in the contiguous United States. In the past 10 years, lethal incidental trapping of wolverines has been minimal (approximately 1 to 2 animals per year or fewer), primarily occurring in Idaho and Montana (see *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*, below). New information suggests that recent overharvest from trapping has occurred in southern Canada in areas that could provide dispersing individuals to the contiguous United States (Mowat et al. 2020, entire). Trapping in southern Canada appears to have had a more negative effect on wolverine populations in Canada than previously thought. Legacy effects of recent unsustainable trapping levels in a portion of the southern Rocky Mountains of Canada could limit dispersal of individuals into the contiguous United States in an area where wolverine connectivity between the United States and southern Canada is vital to the genetic and demographic health of the U.S. wolverine population. See *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes* and Provisions of the Interim 4(d) Rule, below, for further details.

(4) *Comment:* We received several public comments identifying potential threats to wolverines from winter recreation activities, such as snowmobiling and backcountry skiing.

*Our 2020 Response Summarized:* When we published our October 13, 2020, withdrawal document (85 FR 64618), there was little information on the effect of winter recreation on wolverines. We received a final report of a multiyear study on the effects of winter recreation on wolverines (Heinemeyer et al. 2017, entire) in mid-December 2017, and the results of this study were published (Heinemeyer et al. 2019a, entire) prior to the publication of our 2020 withdrawal document. The study found that wolverines were displaced from habitat by winter recreation but maintained multiyear home ranges, and the authors suggest that wolverines are able to tolerate winter recreation at some scales (Heinemeyer et al. 2017, p. iv; Heinemeyer et al. 2019a, p. 16). The study described habitat selection as complex for female wolverines and stated that habitat selection was likely driven by a combination of abiotic (snow, cold) and biotic (predator avoidance, food availability) factors (Heinemeyer et al. 2017, p. 36; Heinemeyer et al. 2019a, p. 16). This study did not assess demographic effects, fitness effects, or population-level effects of winter recreation on wolverines (Heinemeyer et al. 2019a, pp. 17, 19).

*Our 2023 Response:* There are multiple recent studies that indicate wolverines are negatively affected and displaced (at least temporarily) by various types of backcountry winter recreation (Barrueto et al. 2022, entire; Heinemeyer et al. 2019a, entire; Heinemeyer et al. 2019b, entire; Kortello et al. 2019, entire; Mack and Hagen 2022, entire; Regan et al. 2020, entire). The effect of winter recreation activity (of concern due to potential impacts to denning and survival), in isolation, represents a low threat to wolverines in the contiguous United States at the population level. However, in combination with other threats, including decreased snow availability (see *Climate Change*, below) and increased overlap with winter recreationalists in the future due to climate change, winter recreation could negatively affect wolverine population resilience in the future. See *Disturbance Due to Winter Recreational Activity*, below, for further details.

(5) *Comment:* We received public comments claiming that wolverines are dependent on deep snow for survival and expressing concern for future

changes in snowpack due to the effects of climate change.

*Our 2020 Response Summarized:* Our response to this comment in our October 13, 2020, withdrawal document (85 FR 64618) focused on snow availability for denning and the wolverine's ability to cope with changing snow conditions in the denning context. We stated that wolverines can and have denned outside of heavy snowpack, multiple factors play a role in den site selection, females will move dens as young become mobile, and areas of significant snowpack will likely persist in the future the contiguous United States in areas where wolverines are known to den at levels that will continue to support wolverines. Our review of studies of wolverine denning activity found no quantitative data reporting snow depth at the den site when wolverines abandon the den. More importantly, wolverine reproductive success has not been studied relative to a number of abiotic and biotic conditions, including depth and temporal aspect of spring snow cover.

In our evaluation of the effects of climate change to snowpack (see Service 2018, pp. 73–99), we presented a finer-scale analysis (0.0625 km<sup>2</sup> (0.24 mi<sup>2</sup>)) for two study areas (Glacier National Park and Rocky Mountain National Park) that focused directly on May 15, in addition to the presence or absence of snow on May 1 and April 15. These dates are more relevant to the North America wolverine's life-history needs. We also modeled the depth of "significant" snow (0.5 m (20 in)) on these dates. We found that large areas (several hundred km<sup>2</sup>/mi<sup>2</sup> for each study area) of future snow cover (greater than 0.5 m (20 in) in depth) are projected to persist on May 1 at elevations currently used by wolverines for denning. This is true, on average, across the range of climate models used out to approximately year 2055.

*Our 2023 Response:* As discussed above in our response to (1) *Comment*, the wolverine is a snow-adapted species that utilizes cold and snowy habitats for multiple aspects of its life history. To inform our assessment of the wolverine's status in the contiguous United States, we updated our previous climate change analysis, the details of which are summarized in the wolverine SSA report addendum (Service 2023, pp. 47–60). Our analysis focuses on the expected loss of snowpack out to 2100 in five modeling domains that overlap with occupied and potential wolverine habitat in the contiguous United States across latitudinal, longitudinal, and elevation gradients. The Service chose a

snow depth threshold of greater than or equal to 1 m (3.3 ft) to represent significant snow cover on May 1, which provides a more conservative estimate than was used in the 2018 SSA (*i.e.*, greater than or equal to 0.5 m (20 in.) on May 1). This updated analysis shows that cold and snowy conditions at high elevations are expected to decrease, with spring snowpack at denning elevations decreasing as much as 50 percent in some areas. As a result, we expect wolverine population resiliency in the contiguous United States to decrease in the future. For more information see *Climate Change*, below.

(8) *Comment:* We also received public comments recommending that the North American wolverine not be listed as threatened or endangered under the Act. One commenter stated that State wildlife agencies are capable of managing the species and are able to provide protections that ensure continued population growth towards population objectives established by these agencies and that mandates of various Federal resource management agencies provide a commitment to managing wildlife habitat in a way that benefits all wildlife species, including wolverines and other forest carnivores.

*Our 2020 Response Summarized:* We acknowledged that some members of the public supported our decision to withdraw our proposed rule to list the North American wolverine occurring in the contiguous United States as a threatened species under the Act. In the wolverine SSA report (Service 2018, appendix G), we provided a summary of the regulatory protections provided by western States and Federal agencies, as well as management measures being implemented, to conserve the wolverine and its habitat. Trapping or hunting of wolverines was prohibited in the contiguous United States when our October 13, 2020, withdrawal document (85 FR 64618) published.

*Our 2023 Response:* We appreciate the regulatory protections and management measures our State wildlife agency partners and Federal resource management agencies have enacted to conserve the North American wolverine and its habitat (Service 2018, appendix G). However, we have determined that the contiguous U.S. DPS of North American wolverine meets the Act's definition of a threatened species as described in this rule due to future threats, including the reduction in spring snowpack from climate change. This determination is not a reflection on the adequacy of State management or the capability of States to manage the species but rather an acknowledgement of the serious threat posed to the species

by climate change. Along with the listing, we are finalizing an interim 4(d) rule that will promote conservation of the contiguous U.S. DPS of North American wolverine by encouraging management of the landscape by our partners in ways that meet the conservation needs of the wolverine. The provisions of this 4(d) rule provide one of many tools we will use to promote the conservation of the contiguous U.S. DPS of North American wolverine.

(10) *Comment:* We received comments from several organizations that support the listing of the North American wolverine and designation of critical habitat. Threats cited include restricted migration, habitat loss and connectivity related to threats from effects of climate change, nontarget trapping pressures, road mortality and other effects of roads (e.g., noise, pollution, fragmentation of habitat), motorized recreation and traffic in wildlife corridors, timber sales and associated roads, and effects of snowmobile traffic (habitat fragmentation and pollution, and change in behavior).

*Our 2020 Response Summarized:* We found that demographic risks to the species from either known or most likely potential stressors (i.e., disturbance due to winter recreational activities, other human disturbances, effects of wildland fire, disease, predation, overutilization, genetic diversity, small population effects, climate change, and cumulative effects) were low based on our evaluation of the best available information at the time in relation to current and potential future conditions for the North American wolverine occurring in the contiguous United States and in the context of the attributes that affect the needs of the DPS (Service 2018, p. 103). Thus, we determined that the North American wolverine in the contiguous United States did not meet the definition of an endangered species or a threatened species under the Act.

*Our 2023 Response:* Our 2018 wolverine SSA report and 2023 SSA report addendum provide a thorough assessment of the threats affecting the North American wolverine in the contiguous United States. New information related to the threats affecting the contiguous U.S. DPS of the North American wolverine have led us to a different conclusion than the one we presented in our October 13, 2020, withdrawal document (85 FR 64618). In this final rule, we examine the best available information about threats to the wolverine, including effects from roads, disturbance due to winter

recreational activity, other human disturbance, effects from wildland fire, disease, predation, overutilization (trapping), genetic diversity, small population effects, and climate change, including the cumulative effects of these threats. See Summary of Biological Status and Threats, below, for a complete discussion of threats affecting the DPS. After assessing the best available information, we conclude that the contiguous U.S. DPS of the North American wolverine is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

(12) *Comment:* We received comments from several industry groups supporting our August 13, 2014, withdrawal (79 FR 47522) of our February 4, 2013, proposed rule (78 FR 7864) to list the North American wolverine as threatened. In general, their support rests on the following: (1) The DPS determination presented in our previous proposed rules (both 2010 and 2013) was flawed; (2) the North American wolverine does not meet the definition of a threatened species; (3) the obligate relationship with denning and need for snow has not been adequately addressed (and may be a habitat preference); and (4) climate model projections do not support complete loss of snow. They also urged us to reaffirm prior findings that winter recreation (motorized and nonmotorized) is not a threat to wolverines.

*Our 2020 Response Summarized:* We reevaluated wolverines occurring in the contiguous United States under our Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS policy; 61 FR 4722, February 7, 1996). See Distinct Population Segment in the October 13, 2020, withdrawal document (85 FR 64618 at 64628–64631) for more information. We provided our analysis of the status of wolverines in the contiguous United States under Determination of Species Status in the October 13, 2020, withdrawal document (85 FR 64618 at 64645–64647). The topic of denning behavior is discussed in the wolverine SSA report (see “Use of Dens and Denning Behavior” under *Reproduction and Growth* in the wolverine SSA report (Service 2018, pp. 23–28)). For our analysis of the effects of climate change to North American wolverines and denning habitat, see “Climate Change and Potential for Cumulative Effects” in the October 13, 2020, withdrawal document (85 FR 64618 at 64642–64644).

*Our 2023 Response:* In this final rule, we provide our revised evaluation of discreteness and significance under our DPS policy of the segment of the North American wolverine occurring in the contiguous United States considering new information available since the publication of our October 13, 2020, withdrawal document (85 FR 64618). We also explain how new information has led us to a different determination from previous DPS analyses. The analysis contained in this rulemaking supersedes and replaces any previous DPS analysis for the segment of the North American wolverine occurring in the contiguous United States. We conclude that the population of wolverines in the contiguous United States is discrete and significant in relation to the remainder of the species in North America. For more information, see Distinct Population Segment Analysis for Wolverine in the Contiguous United States, below.

The wolverine population in the contiguous United States is expected to decrease in resiliency, redundancy, and representation in the foreseeable future. The best available information suggests that habitat loss as a result of climate change, and the resulting exacerbating effect on other stressors, are likely to decrease the viability of wolverines in the contiguous United States within this century (see “Summary of Future Condition” and Determination of North American Wolverine’s Status, below). Our review of the best scientific and commercial data available indicates that the contiguous U.S. DPS of the North American wolverine meets the Act’s definition of a threatened species.

We acknowledge the precise causal mechanism(s) for the apparent association of wolverine distribution with persistent spring snow are not yet clear. The association could involve the importance of snow for denning or other aspects of the species’ biology and ecology. We address uncertainties under *Areas of Uncertainty for Wolverine Habitat Needs*, below. That said, we know that wolverines are a species that is adapted to, and has a strong preference for, cold and snowy conditions and that these conditions will be reduced in the future. The commenter is accurate in that climate models do not predict a complete loss of snow within the North American wolverine’s range in the contiguous United States. However, we expect climate change to reduce snowpack in areas used by wolverines by as much as 50 percent in some places (see our analysis under *Climate Change*, below). We conclude increasing temperatures and decreasing snowpack have the



largest potential to influence the population viability of the contiguous U.S. DPS of the North American wolverine in the future.

Regarding winter recreation, new information supports our understanding that some forms of winter recreation, backcountry motorized recreation especially, have the potential to negatively impact wolverines. See our response to (4) *Comment*, above, and *Disturbance Due to Winter Recreational Activity*, below, for further details.

#### *Comments From Tribes*

(14) *Comment*: We received comments from one consortium of Tribal nations stating that, based on the weight of evidence provided in our previous rules, the North American wolverine meets the Act's definition of endangered or threatened and is therefore warranted for listing. Specific threats mentioned in the comment letter included current population status, winter recreation activities, and effects of climate change. The Tribes also included comments documenting the cultural value of the wolverine and connection to cultural practices and concern for the loss of wolverine populations in the contiguous United States. The Tribes encouraged the Service to use sound and solid science in the listing determination and noted that additional population monitoring and Tribal climate change modeling efforts are under way to evaluate the status of the wolverine.

*Our 2020 Response Summarized*: We appreciate the unique perspective provided by the Tribal nations regarding the contribution of the North American wolverine to the Tribes' culture and spirituality. We also appreciate the commitment of the Tribal nations to continue studies of wolverines.

We used the best available scientific information to provide a detailed description of the North American wolverine's life history and ecology, including a detailed discussion of wolverine denning habitat and behavior. We conducted an analysis to assess the current population status. Conservation measures and regulatory mechanisms relative to the North American wolverine were also provided in the wolverine SSA report. This information was used to evaluate the current and future conditions of the DPS. We evaluated results from a fine-scale analysis of the potential effects of climate change to future snowpack conditions and found significant areas of snow (several hundred km<sup>2</sup>/mi<sup>2</sup>) will persist on May 1 at elevations used by wolverines for denning. We determined that, based on the best available

information, the North American wolverine in the contiguous United States did not warrant listing as threatened or endangered under the Act in 2020.

*Our 2023 Response*: We appreciate the commitment of the Tribal nations to further our knowledge of this unique species. We have gathered the best available information on North American wolverines and used this information to assess the current and future population status of wolverines in the contiguous United States.

Regarding winter recreation, see our response to (4) *Comment*, above, and *Disturbance Due to Winter Recreational Activity*, below, for further details.

Regarding the effects of climate change to North American wolverines, see our response to (1) *Comment*, above, and *Climate Change*, below. We conclude that the contiguous U.S. DPS of the North American wolverine is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

(15) *Comment*: We received comments from one Tribe whose territory is occupied by the North American wolverine. The Tribe submitted a comment letter in 2013 supporting our proposed listing. The Tribe stated that the conservation and restoration of the wolverine and other species within this homeland is of great importance to the Tribe's subsistence, culture, religion, and economy. The letter also identified conservation and management plans currently under development and highlighted that the wolverine is designated as a species of concern in these current draft plans. Specific comments were provided relative to threats from climate change (including relative to demographic stochasticity), recreation and urban development, and incidental take. Included in those comments were references to other studies under way (e.g., Adaptation Partners and climate change vulnerability assessments; winter recreation study) to evaluate these potential stressors.

*Our 2020 Response Summarized*: We appreciate the perspective provided regarding the importance of the North American wolverine and other species to the Tribe and its commitment to current and future conservation and management actions. We also appreciate and evaluated the information presented in the citations that were provided in the comment letter. The best available scientific information was used to evaluate the current conditions (i.e., potential stressors, including winter recreation) and future conditions (e.g.,

effects of climate change) of the DPS. Based on the best available information, we determined that the North American wolverine in the contiguous United States did not warrant listing as endangered or threatened under the Act in 2020.

*Our 2023 Response*: Information previously provided by the Tribe was considered in the 2018 SSA report. We include new and updated scientific information in the 2023 wolverine SSA report addendum, including information on the current conditions (i.e., potential stressors, including winter recreation) and future conditions (e.g., effects of climate change) of the DPS. Based on the best available information, we now determine that the contiguous U.S. DPS of the North American wolverine meets the Act's definition of a threatened species.

#### *State Agency Comments*

In our October 13, 2020, withdrawal document (85 FR 64618), we also addressed the extensive comments from several western States, including previously submitted comments in response to the February 4, 2013, proposed listing rule (78 FR 7864) as well as additional comments submitted in response to our October 18, 2016, document that reopened the public comment period on the 2013 proposed listing rule (81 FR 71670). These comments were grouped together and summarized as described below.

(16) *Comment*: We received detailed comments critical of our reliance on "unverified" climate model projections in our February 4, 2013, proposed listing rule, the lack of discussion of assumptions in adopting the model findings, the lack of evaluating alternative hypotheses, and the need to evaluate these effects at the den-site scale. One State agency recommended that, given the disagreements in the scientific community on the interpretation of these results, the Service solicit an independent, scientific review of the February 4, 2013, proposed listing rule.

*Our 2020 Response Summarized*: In preparing the 2018 SSA report for the North American wolverine, our foundational science document for informing the October 13, 2020, withdrawal (85 FR 64618), we reviewed available reports and peer-reviewed literature, incorporated survey information for the purpose of preparing updated maps of the known current and historical occurrences of the North American wolverine, and contacted species experts to collect additional unpublished information. We evaluated the appropriate analytical tools to

address data gaps and uncertainties. In some instances, we used publications and other reports of the Eurasian subspecies (*Gulo gulo gulo*) to fully inform our knowledge of the North American wolverine (*Gulo gulo luscus*).

Before finalizing the 2018 SSA report, the draft wolverine SSA report was submitted for peer review to four independent peer reviewers and submitted to our Federal, State, and Tribal partners for scientific review. We incorporated the results of these reviews in the 2018 wolverine SSA report, as appropriate.

We recognized that climate trends and future (2055 and later) climate model projections indicated warming temperatures for much of western North America, and changes to snowpack conditions. Our assessment of climate change impacts indicated that large areas (several hundred km<sup>2</sup>/mi<sup>2</sup> for each study area) of future snow (greater than 0.5 m (20 in) in depth) would persist on May 1 at elevations currently used by wolverines for denning. This was true, on average, across the range of climate models used out to approximately year 2055.

*Our 2023 Response:* In the 2023 wolverine SSA report addendum, we expanded upon our climate analysis from the 2018 SSA report. Both SSA documents went through an independent, scientific peer review process. The assessment of the climate modeling results, presented below under *Climate Change*, and applied in the “Summary of Future Condition” discussion, replaces and supersedes the analysis of modeling results presented in the February 4, 2013, proposed listing rule (78 FR 7864) and the October 13, 2020, withdrawal document (85 FR 64618). We acknowledge there are uncertainties around the nature of the wolverine’s relationship with cold and snowy conditions (see *Areas of Uncertainty for Wolverine Habitat Needs*, below). Cold and snowy conditions at high elevations favored by wolverines in the contiguous United States are expected to decrease, with spring snowpack at denning elevations decreasing as much as 50 percent in some areas.

(17) *Comment:* We received comments critical of our previous support for findings by Schwartz et al. (2009) regarding effective population size. Relatedly, several States commented on recent dispersal/movements of wolverines into California, Colorado, and Utah as evidence of population expansion.

*Our 2020 Response Summarized:* In the October 13, 2020, withdrawal document (85 FR 64618), we referred to

our response to (2) *Comment* for a discussion of effective population size (85 FR 64618 at 64620). Regarding recent occurrences of wolverines in the contiguous United States, we noted that wolverines had recently been found in areas where they were once extirpated in the contiguous United States. See “Population Abundance and Density” in the October 13, 2020, withdrawal document (85 FR 64618 at 64634–64636) for more information.

*Our 2023 Response:* The best available estimate of effective population size for the Northern Rocky Mountains continues to be that provided by Schwartz et al. 2009 (p. 3226): 35 (credible interval = 28–52). We estimated the effective population size of wolverines in the North Cascades to be four (Service 2023, p. 27). We are not aware of any other estimates of the effective population size of North American wolverines in the contiguous United States. See also our response to (2) *Comment*, above, and *Effective Population Size in the Contiguous United States*, below, for more information.

We have gathered updated occurrence information in our 2023 wolverine SSA report addendum (Service 2023, figure 2). We acknowledge that there are recent occurrences of wolverines in the western United States in areas where they have not been reported for years or very rarely (California, Colorado, Oregon, and Utah). These occurrences outside of the known breeding distribution are encouraging, but there is no evidence of breeding population expansion into California, Colorado, Oregon, and Utah.

(18) *Comment:* We received comments from several western States presenting clarifications or updates to incidental trapping events and trapping regulations.

*Our 2020 Response Summarized:* We noted that trapping or hunting of wolverines was not allowed in any western State (with the exception of Alaska, which was not included in the DPS in our February 4, 2013, proposed listing rule (78 FR 7864)). Legal protections for wolverines are codified in western State laws and regulations concerning hunting and trapping. Since 2013, there has been a zero quota for trapping or harvest of wolverines in Montana. We described the documentation of incidental trapping of wolverines in the contiguous United States (as recently as December 2017) and noted that not all events resulted in mortality. We acknowledged that both Idaho and Montana are implementing trapper education programs to minimize nontarget wolverine captures.

*Our 2023 Response:* We gathered updated information from States within the North American wolverine’s range about incidental trapping, trapping regulations, and measures taken by States to prevent incidental trapping of wolverines. Lethal incidental trapping of wolverines has been minimal (1 to 2 animals per year), primarily occurring in Idaho and Montana. In the *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes* discussion, below, we provide an assessment of incidental trapping and the measures States are taking to reduce incidental trapping of wolverines.

(19) *Comment:* Several States provided comments in response to our February 4, 2013, proposed listing rule (78 FR 7864) and our October 18, 2016, reopening of the public comment period (81 FR 71670) indicating their disagreement with our determination of a wolverine DPS for the contiguous United States. Specifically, some commenters stated that the criteria of significance should be reevaluated, noting that the February 4, 2013, proposed listing rule did not provide any substantive information to support our conclusion that the loss of the wolverine in the contiguous United States would result in a significant gap in the range of the species; that is, our previous use of the loss of latitudinal range does not provide a rational basis for concluding that the loss of the wolverine in the contiguous United States would be significant in relation to the taxon. Another commenter stated that the wolverine population in the contiguous United States is connected geographically and genetically to the Canada/Alaska populations and these northern populations were likely the source of recolonization during the 20th century. Further, this commenter stated there is not a difference in control of exploitation and conservation status between the United States and Canada.

Another commenter noted that, throughout the February 4, 2013, proposed listing rule, the Service acknowledged that, historically, the wolverine population in the contiguous United States was markedly reduced by systematic predator control programs and unregulated trapping. The commenter pointed out that areas of suitable habitat in the North Cascades, where trapping has been minimal or nonexistent for decades, and northern Rockies were recolonized by animals from Canada, where relatively liberal trapping is still allowed. The commenter asserted that our characterization in the February 4, 2013, proposed listing rule of “liberal”

Canadian regulations as sufficient to “maintain the robust conservation status of the Canadian population,” does not comport with our characterization that the very limited trapping in the contiguous United States (Montana only) is insufficient to maintain the rebounding population designated as a DPS.

*Our 2020 Response Summarized:* In light of the updated analysis and new information included in the 2018 wolverine SSA report, we reevaluated wolverines in the contiguous United States under our DPS policy. We concluded that the population of wolverines in the contiguous United States was not discrete in relation to the remainder of the species in North America. As a result, in 2020, the population of wolverines in the contiguous United States was not a listable entity under section 3(16) of the Act. See Distinct Population Segment in the October 13, 2020, withdrawal document (85 FR 64618 at 64627–64631) for more information.

*Our 2023 Response:* As stated above, in this final rule we provide our revised evaluation of discreteness and significance under the DPS policy of the segment of the North American wolverine occurring in the contiguous United States considering new information. We also explain how new information has led us to different conclusions from previous DPS analyses. The analysis contained in this rulemaking supersedes and replaces any previous DPS analysis for the segment of the North American wolverine occurring in the contiguous United States.

Regarding the commenter’s concern with the significance analysis, we have determined, as we did in the February 4, 2013, proposed listing rule, that there is evidence that the loss of the wolverine in the contiguous United States would result in a significant gap in the range of the taxon. Based upon the loss of approximately 58,998,140 acres (238,757 km<sup>2</sup>) of high-quality wolverine habitat from the southern extent of the range and the adaptive potential that part of the range provides against oncoming climate change impacts, and the 12-degree latitudinal gap in the wolverine’s range that would result if the U.S. population was lost, we determine that the loss of the contiguous U.S. wolverine population would result in a significant gap in the range of the taxon. Thus, the DPS meets the definition of significant in our DPS policy. For more information see *Analysis of Significance*, below.

Regarding the commenter’s assertion that wolverines in the contiguous

United States are connected to Canada, which relates to the discreteness analysis of our DPS policy, we do not consider wolverines in the contiguous United States to be genetically or morphologically discontinuous from wolverines in Canada (McKelvey et al. 2014, entire; Pilgrim and Schwartz 2018, entire; Sawaya et al. 2023, entire). Therefore, wolverines in the contiguous United States are not discrete based on marked separation from other populations of the same taxon. However, we determined that the wolverine meets the discreteness criterion in our DPS policy (61 FR 4722; February 7, 1996), as delimited by the international boundary with Canada and given differences in control of exploitation, conservation status, and regulatory mechanisms that are significant in light of section 4(a)(1)(D) of the Act. See *Analysis of Discreteness*, below, for more information.

Finally, regarding the commenter’s point about our characterization in the February 4, 2013, proposed listing rule of trapping in Canada versus the contiguous United States, we have considered updated trapping information in our DPS analysis. New information available since the publication of our October 13, 2020, withdrawal document (85 FR 64618) indicates that overharvest from trapping in Canada was likely causing more of an impact than previously thought. Recent studies show that harvest levels in portions of southeastern British Columbia and southwestern Alberta were unsustainable and causing population declines (Mowat et al. 2020, entire; Barreto et al. 2022, entire) and could negatively impact movement of individuals from Canada to the contiguous United States (Sawaya 2023, pers. comm.). We now conclude that the differences between Canada and the United States in control of exploitation are significant in light of section 4(a)(1)(D) of the Act and the wolverine population in the contiguous United States meets the DPS policy’s standard for “discreteness.” See *Analysis of Discreteness*, below, for more information.

We conclude that the population of wolverines in the contiguous United States is discrete and significant in relation to the remainder of the species in North America. For our complete DPS analysis, see Distinct Population Segment Analysis for Wolverine in the Contiguous United States, below.

*Comments Received in Response to Our November 23, 2022, Publication*

As stated above, on November 23, 2022, we published a document in the

**Federal Register** (87 FR 71557) soliciting new information to update the wolverine SSA so that we could reevaluate whether the North American wolverine occurring in the contiguous United States is a distinct population segment and, if so, whether the distinct population segment meets the definition of an endangered or threatened species under the Act. This document also notified the public that the February 4, 2013, proposed listing rule (78 FR 7864) had been reinstated as a result of court action. In response to the November 23, 2022, publication, we received additional information including survey results, reports, documented mortalities, management efforts, and recent wolverine literature that we evaluated and incorporated as appropriate into our wolverine SSA report addendum. Although not requested, we also received comments from submitters on topics related to determinations regarding wolverine, including whether the wolverine should or should not be listed as an endangered or threatened species under the Act. The comments we received are similar to those we present and respond to above.

*Peer Reviewer Comments on the 2023 Wolverine SSA Report Addendum*

We received comments from three peer reviewers on the draft wolverine SSA report addendum. We reviewed all comments we received from the peer reviewers for substantive issues regarding the information contained in the wolverine SSA report addendum, as well as any new information. The peer reviewers generally provided additional references, clarifications, and suggestions, including further definitions of some of the terms used in the wolverine SSA report addendum. We updated the wolverine SSA report addendum based on the peer reviewers’ comments, including revising some of our adaptive capacity scores, clarifying specific points where appropriate, and adding additional details and suggested references where needed. Peer reviewer comments are addressed in the following summary.

*(PR1) Comment:* Regarding our climate change analysis, one peer reviewer did not agree with our initial characterization of the shared socioeconomic pathway (SSP) 5–8.5 emissions scenario as worst case, and stated there are possible scenarios that could be more extreme. They also recommended the wolverine SSA report addendum more clearly point out the uncertainty around the climate models and emissions scenarios by stating the scenarios are representative of a large

portion of plausible outcomes, but not all.

*Our Response:* We addressed the peer reviewer's concern by removing mention of likelihood when discussing specific emissions scenarios. We also modified the text to include the latest guidance from the White House Office of Science and Technology Policy on Selecting Climate Information to Use in Climate Risk and Impact Assessments (OSTP 2023, entire), which recommends using SSP5–8.5 as an upper bounding scenario. We applied SSP5–8.5 as the upper bound to estimate future snow cover available for wolverines within the selected domains.

*(PR2) Comment:* A peer reviewer questioned why we used the SSP2–4.5 and SSP5–8.5 emissions scenarios for our future condition analysis. They suggested we use SSP1–1.9 instead of SSP2–4.5 since it is the opposite extreme of SSP5–8.5.

*Our Response:* For our future analysis, we used SSP2–4.5 because that emissions scenario is closest to the current emissions trajectory we are on now, which provides a plausible lower boundary estimate of future snow cover available for North American wolverines. The Intergovernmental Panel on Climate Change (IPCC) has recently deemed our ability to limit warming to 1.5 °C (2.7 °F) (SSP1–1.9) as “impossible” with no or limited overshoot in its 2022 gap analysis (Riahi et al. 2022, p. 298). Scenario SSP5–8.5 reflects a no-emissions mitigation policy, which provides a plausible upper boundary estimate of available future snow cover.

*(PR3) Comment:* A peer reviewer was concerned that the wolverine SSA report addendum did not list snow as an important attribute when studies have shown dens are concordant with spring snow coverage. The peer reviewer disagreed with our reasoning for excluding snow, which was because we do not know how it impacts survival and reproduction, and stated we should also remove food habits, physical features, and home range size since it is not clear how any of these impact survival and reproduction. They believe the case for snow is much stronger than any of these other factors.

*Our Response:* We considered the information provided and addressed the peer reviewer's concern by updating the wolverine SSA report addendum to include snow as an important attribute of wolverine habitat.

*(PR4) Comment:* One peer reviewer was concerned about the use of spring snow cover for distribution. They questioned our use of the term “persistent spring snow” and the May

15 end date that is often associated with the term. The peer reviewer recommended analyzing snow cover between February and March, when young are newborn and most in need of thermal cover in natal dens. The reviewer believed that any analysis of climate change effects at those more critical times for denning would not likely show impacts.

*Our Response:* We used the term “persistent spring snow” in the wolverine SSA report addendum because it is a term frequently used in the scientific literature for wolverines and appears to be correlated to the wolverine's circumpolar distribution. Snow model outputs for May 1 are presented in the 2023 wolverine SSA report addendum. May 1 was used based on previous studies documented in the 2018 SSA (Service 2018, p. 26), indicating wolverine den site abandonment generally occurs before May 1. We acknowledge that young kits are in natal dens usually from mid-February to mid-March, so the use of May 1 snow projections is a conservative approach, but one which is consistent with the literature.

As described in the wolverine SSA report addendum, there are a number of hypotheses for why wolverines prefer cold and snowy habitats, and not all of them are limited to denning (*i.e.*, easier to get food, more food caching sites, etc.). These things could be important for adults throughout the breeding cycle or for juveniles as they become more independent from their mothers. We also discuss the possibility of other factors that are correlated to persistent spring snow, such as low temperatures (also analyzed in Copeland et al. 2010, entire), being the causal mechanisms for the observed relationship. In the wolverine SSA report addendum, we acknowledge wolverines have been documented denning in areas without persistent spring snow (Aronsson and Persson 2017, p. 266; Copeland et al. 2010, pp. 240–242; Fisher et al. 2022, p. 8; Jokinen et al. 2019, pp. 6–8; Persson et al. 2023, entire; Webb et al. 2016, pp. 1466–1467); however, this phenomenon appears to be associated with cold, high-latitude boreal or arctic forests rather than the alpine habitats used by wolverines in the contiguous United States. In the contiguous United States, there is no evidence that wolverines have denned in areas without persistent spring snow.

*(PR5) Comment:* One peer reviewer recommended including potential ways wolverines could adapt their denning behavior or use smaller or shallower patches of snow for denning in response to effects from climate change.

*Our Response:* We added language to the wolverine SSA report addendum to address this comment and we also included additional text that snow may be important for more than just denning. As stated above, there is no evidence that wolverines have denned in areas without persistent spring snow in the contiguous United States.

*(PR6) Comment:* A peer reviewer pointed out that future recreation will not just increase due to an increase in the human population, but also because snow-dependent recreational activities will be constrained to a smaller area that still contains quality snow in the future.

*Our Response:* We included text in the wolverine SSA report addendum reflecting the reviewer's comment.

*(PR7) Comment:* One peer reviewer suggested adding Colorado's wolverine reintroduction plan to the wolverine SSA report addendum as a voluntary conservation measure.

*Our Response:* We updated the wolverine SSA report addendum to include a description of Colorado Parks and Wildlife's previous consideration of reintroducing wolverines to Colorado as a nonessential experimental population (see 78 FR 7890, February 4, 2013). We also describe how this proposal was subsequently withdrawn in 2014 (see 79 FR 47522, August 13, 2014), when we withdrew the February 4, 2013, proposed listing rule (78 FR 7864), and that there is currently no formal proposal to reintroduce wolverines to Colorado.

*(PR8) Comment:* Two peer reviewers provided additional documentation regarding roads acting as a barrier to wolverine dispersal. Both provided different situations where at least one wolverine was seen crossing roadways, including a multiple-lane highway. One peer reviewer also mentioned regularly seeing wolverine tracks crossing roadways.

*Our Response:* We updated the wolverine SSA report addendum to reflect these observations and modified the text to clarify that highways can limit female gene flow in some situations, but they are not complete barriers to wolverine movements.

*(PR9) Comment:* One peer reviewer questioned how the artificial cutoff of the U.S.–Canada international border influenced the results of the 2009 effective population size analysis (Schwartz et al. 2009, entire).

*Our Response:* The effective population size estimate was only for the U.S. portion of the Northern Rockies, and there were no samples taken from Canada. As we stated in the wolverine SSA report addendum, connectivity to larger source

populations can alleviate the adverse effects of small effective population sizes (Frankham et al. 2014, entire). We also added a paragraph to the wolverine SSA report addendum to explain that because effective population size estimates for wolverine are small, connectivity with populations in Canada to allow for migration and gene flow is crucial to maintaining genetic diversity.

*(PR10) Comment:* One peer reviewer was concerned that current data for the wolverine are not being compared to what is known historically. They specifically called out the comparison of population sizes, the distribution and abundance of wolverines in the contiguous United States, and the results of genetic studies.

*Our Response:* As the peer reviewer mentioned, there is a lack of historical data to compare to current conditions. However, our assessment is a forward-looking one, based on current and future conditions, and not the change from historical conditions to current conditions.

*(PR11) Comment:* One peer reviewer questioned the 40 percent decline in wolverine abundance within a national park complex in southwestern Canada (Mowat et al. 2020, entire; Barrueto et al. 2022, entire).

*Our Response:* The Barrueto et al. (2022) effort is a decade-long research project that was peer reviewed and published in a scientific journal. We note that the initial population estimate was approximately 50 wolverines at the start of the study, so a 40 percent decline over 10 years results in the loss of approximately 15–20 wolverines. The wolverine SSA report addendum has been updated to provide this additional detail.

*(PR12) Comment:* A peer reviewer suggested including additional detail on how species-specific trapping and snaring reduce the likelihood of incidentally capturing a wolverine.

*Our Response:* We updated the wolverine SSA report addendum to include how trappers use pan tension, site selection, and snare height to reduce the likelihood of incidental capture. We also included additional information we received from the States on their efforts to reduce incidental trapping of wolverines.

*(PR13) Comment:* One peer reviewer suggested that the median and quartiles presented in our modeling may not accurately capture the variability in environmental conditions. The reviewer suggested that in addition to calculating the lower-quartile, median, and upper-quartile at each individual grid cell and timestep, we should also calculate the

maximum and minimum bracketing response.

*Our Response:* We did not conduct the additional suggested analysis. The additional analysis would require significant work and time, and we conclude our approach includes the majority of plausible future outcomes and incorporates the best available information to inform our listing determination.

## I. Final Listing Determination

### Background

A comprehensive review of the life history, population trends, and ecology of the North American wolverine is presented in the wolverine SSA report (Service 2018, pp. 3–44) and wolverine SSA report addendum (Service 2023, entire). The Service recognizes the North American wolverine as the subspecies *Gulo gulo luscus* (Service 2018, p. 8). Wolverines are a medium-sized (about 1 m (3.3 feet (ft)) in length) carnivore, with a large head, broad forehead, and short neck (Service 2018, p. 4). Wolverines have heavy musculature and relatively short legs, and large feet with strong, curved claws for digging and climbing (Service 2018, p. 4). Their feet are adapted for travel through deep snow and, during the winter, dense, stiff, bristle-type hairs are found between the toes and around the foot pad. This characteristic becomes diminished in the summer (Service 2018, p. 4). The wolverine is the largest terrestrial member of the Mustelidae family, which includes weasel, fisher, mink, marten, and others, and resembles a small bear with a bushy tail (Service 2018, p. 1). Wolverines possess a number of morphological and physiological adaptations that allow them to travel long distances, and they maintain large territories in remote areas (Service 2018, p. 1). They have been described as curious, intelligent, and playful but cautious animals, though their social behavior and social organization has not been well-studied (Service 2018, p. 1). In North America, wolverines are found in Alaska, much of Canada, and the western-northwestern United States.

During the late 1800s and early 1900s, the wolverine population declined or was extirpated in much of the contiguous United States (lower 48 States), which was most likely the result of unregulated trapping and predator poisoning campaigns. Following regulation of trapping and restrictions on the use of poison, the wolverine population rebounded to some extent, and their distribution expanded to refill a portion of their previously extirpated

range. In the contiguous United States, wolverines are known to reproduce in Washington, Idaho, Montana, and Wyoming (Service 2023, figure 3). Solitary individuals or lone dispersing individuals have been observed in other western States (Oregon, Colorado, Utah, and California), but there is no evidence of reproduction in the contiguous United States outside of the Northern Rocky Mountains in Idaho, Montana, and Wyoming and the Cascade Mountains of Washington.

## Regulatory and Analytical Framework

### Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species. In 2019, jointly with the National Marine Fisheries Service, the Service issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and the criteria for designating listed species' critical habitat (84 FR 45020; August 27, 2019). On the same day, the Service also issued final regulations that, for species listed as threatened species after September 26, 2019, eliminated the Service's general protective regulations automatically applying to threatened species the prohibitions that section 9 of the Act applies to endangered species (84 FR 44753; August 27, 2019).

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

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

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

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

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

These factors represent broad categories of natural or human-caused

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

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

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

The Act does not define the term "foreseeable future," which appears in the statutory definition of "threatened species." Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term "foreseeable future" extends only so far into the future as we can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide

a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

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

#### *Analytical Framework*

The wolverine SSA report and SSA report addendum document the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the North American wolverine, including an assessment of the potential threats to the subspecies occurring in the contiguous United States. The wolverine SSA report and SSA report addendum do not represent our decision on whether the North American wolverine should be listed as an endangered or threatened species under the Act. However, they do provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

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

described the beneficial and risk factors influencing the subspecies' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual subspecies' life-history needs. The next stage involved an assessment of the historical and current condition of the subspecies' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the subspecies' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species (which, under the Act, includes any subspecies of fish or wildlife or plants, and any DPS of any species of vertebrate fish or wildlife which interbreeds when mature) to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Later in this document, we present a summary of the key results and conclusions from the 2018 wolverine SSA report and 2023 wolverine SSA report addendum; the full SSA report and SSA report addendum can be found at Docket No. FWS–R6–ES–2023–0216 on <https://www.regulations.gov> and at <https://ecos.fws.gov/ecp/species/5123>.

#### **Distinct Population Segment**

Pursuant to the Act, we must consider for listing any species, subspecies, or, for vertebrates, any DPS of these taxa, if there is sufficient information to indicate that such action may be warranted. To interpret and implement the DPS provision of the Act and Congressional guidance, the Service and the National Marine Fisheries Service published, on February 7, 1996, an interagency Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Act (DPS policy; 61 FR 4722, February 7, 1996). The DPS policy addresses the recognition of DPSs for potential listing actions. The DPS policy allows for more refined application of the Act that better reflects the biological needs of the taxon being considered, and avoids the inclusion of entities that do not require its protective measures.

Under our DPS policy, three elements are considered in a decision regarding the status of a possible DPS as endangered or threatened under the Act. These are applied similarly for additions to the Lists of Endangered and Threatened Wildlife and Plants (Lists), reclassification, and removal from the Lists. They are: (1) Discreteness of the

population segment in relation to the remainder of the taxon; (2) the biological or ecological significance of the population segment to the taxon to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing (*i.e.*, whether the population segment is, when treated as if it were a species or subspecies, an endangered or threatened species). Discreteness refers to the degree of isolation of a population from other members of the species, and we evaluate this factor based on specific criteria. If a population segment is considered discrete, we must consider whether the discrete segment is "significant" to the taxon to which it belongs by using the best available scientific and commercial information. When determining if a potential DPS is significant, our policy directs us to sparingly list DPSs while encouraging the conservation of genetic diversity. If we determine that a population segment is both discrete and significant, we then evaluate it for endangered or threatened species status based on the Act's standards.

We have conducted several DPS analyses of wolverines in the contiguous United States since 2010 in response to new information and legal challenges. We first found that the population qualified as a DPS in our 2010 12-month finding (75 FR 78030; December 14, 2010) on a petition to list the population as a DPS. We reaffirmed and summarized this finding in our February 4, 2013, proposed listing rule (78 FR 7864). In 2020, we reversed our previous finding, based on information at the time which suggested the population was not discrete from wolverine populations in Canada (85 FR 64618; October 13, 2020). Below, we provide our revised evaluation of discreteness and significance under the DPS policy of the segment of the North American wolverine occurring in the contiguous United States. Where necessary and appropriate below, we explain how new information has led us to different conclusions from previous DPS analyses. The analysis contained in this rulemaking supersedes and replaces any previous DPS analysis for the segment of the North American wolverine occurring in the contiguous United States. We determined that the contiguous U.S. population of the North American wolverine meets the discreteness criterion in our DPS policy; it is delimited by the international boundary with Canada, and there are differences between the United States and Canada regarding control of exploitation, conservation status, and

regulatory mechanisms that are significant in light of section 4(a)(1)(D) of the Act. We then determined that the North American wolverine population occurring in the contiguous United States is significant because its loss would result in a significant gap in the range of the taxon.

### **Distinct Population Segment Analysis for Wolverine in the Contiguous United States**

#### *Analysis of Discreteness*

Under our DPS policy, a population segment of a vertebrate species may be considered discrete 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); or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act (inadequacy of existing regulatory mechanisms).

#### **Discreteness Based on Marked Separation**

In our February 4, 2013, proposed listing rule (78 FR 7864), we did not find marked separation from other populations to support discreteness of the contiguous U.S. wolverine population. We also did not find marked separation to support discreteness in our October 13, 2020, withdrawal (85 FR 64618). Our review of the new information presented in the 2023 wolverine SSA report addendum has not altered that conclusion; we continue to find that there are no physical, physiological, ecological, or behavioral factors separating wolverines in the contiguous United States from wolverines in Canada. We do not consider wolverines in the contiguous United States to be genetically or morphologically discontinuous from wolverines in Canada based on genetic information that supports that Canadian wolverines repopulated the contiguous United States over the past several decades and there are no unique haplotypes in the contiguous U.S. population (McKelvey et al. 2014, entire; Pilgrim and Schwartz 2018, entire; Sawaya et al. 2023, entire). Therefore, wolverines in the contiguous United States are not discrete based on marked separation from other populations of the same taxon.

We next evaluate whether the wolverine population in the contiguous United States is discrete based on the international boundary with Canada. We separately consider below whether there is discreteness based on differences between the two countries in terms of control of exploitation, management of habitat, conservation status, or regulatory mechanisms that are significant in light of section 4(a)(1)(D) of the Act (inadequacy of existing regulatory mechanisms).

#### **Discreteness Based on the International Border—Differences in Control of Exploitation**

In our 2010 12-month finding (75 FR 78030; December 14, 2010) and 2013 proposed listing rule (78 FR 7864; February 4, 2013), we noted that differences in control of exploitation exist between the United States and Canada, but concluded those differences did not result in discreteness because the differences favored the contiguous U.S. population, the population that is at risk. In the wolverine 2018 SSA report, we noted that trapping or hunting of wolverines is currently prohibited in the contiguous United States and is allowed in Canada (Service 2018, pp. 68–69). In that 2018 SSA report, we included an analysis of trapping efforts in southern Canada and trapping effort along the U.S.–Canada border, and based on that analysis, we found trapping to be limited. We again concluded in our October 13, 2020, withdrawal document (85 FR 64618) that the differences in exploitation were not significant in light of section 4(a)(1)(D) of the Act (inadequacy of existing regulatory mechanisms).

However, new information available since the publication of the October 13, 2020, withdrawal document indicates that trapping in Canada was likely causing more of an impact than previously thought. Recent studies show that harvest levels in portions of southeastern British Columbia and southwestern Alberta were unsustainable and causing population declines (Mowat et al. 2020, entire; Barreto et al. 2022, entire). The areas evaluated are close enough to the international border that dispersing individuals would be likely to provide important genetic diversity and demographic rescue to the population in the contiguous United States. Harvest levels in Canada could negatively impact movement of individuals from Canada because, with reduced populations in Canada, there is less pressure on individuals to move south to areas in the United States to find suitable vacant home ranges (Sawaya

2023, pers. comm.). Furthermore, female wolverines appear less likely to disperse long distances or across major roadways compared to males (Sawaya et al. 2019, pp. 621–23). According to the latest genetic analyses, virtually all of the recent movement of wolverines from Canada to the United States appears to be by males (Sawaya et al. 2023, pp. 12–14, 17). Although there is now a trapping moratorium in southeastern British Columbia (British Columbia 2022, p. 76), it is unclear how long the moratorium will be in place or what the legacy effects of recent overharvest in southern British Columbia will be. In addition, trapping continues to be allowed in portions of southern Alberta. We conclude that harvest in Canada will continue to be an impediment to effective dispersal of wolverines into the United States. This, in turn, is likely to impact future genetic integrity of the population in the contiguous United States and limit the ability for demographic rescue should wolverines decline in number within the contiguous United States. Thus, we now conclude, based on new information, that the differences between Canada and the United States in control of exploitation are significant in light of section 4(a)(1)(D) of the Act. Existing regulations in Canada have been inadequate to address this exploitation. Alberta continues to allow trapping in areas important for potential dispersing wolverines, and there is uncertainty on the length and effectiveness of the trapping moratorium in British Columbia and the long-term population effects of the recent overharvest there. As a result, we conclude the wolverine population in the contiguous United States meets the standard of “discreteness” and we use the international border between the United States and Canada to define the northern boundary of the contiguous U.S. wolverine discrete population.

#### Discreteness Based on the International Border—Differences in Management of Habitat

In the 2013 proposed listing rule (78 FR 7864; February 4, 2013) and October 13, 2020, withdrawal document (85 FR 64618), we stated that management activities (e.g., timber harvest, wildland firefighting, prescribed fire, and silviculture) can modify wolverine habitat, but this species appears to be little affected by changes to the vegetative characteristics of its habitat. However, recent research in Canada indicates that wolverines and other carnivores can be displaced from habitat that is subject to human disturbance that includes harvest cut-blocks in

forested habitat (Frey et al. 2020, entire). That said, most wolverine habitat in the contiguous United States occurs at high elevations in rugged terrain that is not usually conducive to intensive forms of silviculture and timber harvest. Although recent information indicates wolverines may be affected by disturbance from some types of habitat management, these disturbances occur in both the contiguous United States and southern Canada, where forested alpine habitats are managed in relatively similar ways and are relatively limited in scope and scale in wolverine habitat. Therefore, there are no significant differences in management of habitat between the United States and Canada pursuant to 4(a)(1)(D) of the Act.

#### Discreteness Based on the International Border—Differences in Conservation Status

In the December 14, 2010, 12-month finding (75 FR 78030), which is summarized in the February 4, 2013, proposed listing rule (78 FR 7864), we found that the wolverine population in the contiguous United States met the second DPS discreteness condition because of differences in conservation status as delimited by the U.S.-Canada international governmental boundary. We found that those differences were substantial and significant in light of section 4(a)(1)(D) of the Act. We stated that in the remaining current range in Canada and Alaska, wolverines exist in well-distributed, interconnected, large populations. We added that, conversely, wolverine populations in the remaining contiguous U.S. range appear to be at numbers so low that their continued existence could be at risk, especially in light of the threats to the subspecies. In the 2010 12-month finding, we stated that risks come from three main factors: (1) Small total population size; (2) effective population size below that needed to maintain genetic diversity and demographic stability; and (3) the fragmented nature of wolverine habitat in the contiguous United States that results in smaller, isolated patches separated by unsuitable habitat. As a result, we concluded that the contiguous U.S. population of the wolverine met the discreteness criterion in our DPS policy. Consequently, we used the international border between the United States and Canada to define the northern boundary of the contiguous U.S. DPS of the North American wolverine in our December 14, 2010, 12-month finding (75 FR 78030) and our February 4, 2013, proposed listing rule (78 FR 7864).

In our October 13, 2020, withdrawal document (85 FR 64618), based on new

information at the time, we concluded there were not significant differences in control of exploitation, conservation status, and management of habitat, nor other threats to the wolverine requiring regulatory mechanisms to address them, and we concluded that there are no differences in regulatory mechanisms between the United States and Canada that are significant in light of section 4(a)(1)(D) of the Act. As a result, we concluded that the contiguous U.S. population of the North American wolverine did not meet the discreteness criterion in our DPS policy. Below, we revisit discreteness based on the international border and differences in conservation status considering new information presented in the wolverine SSA report addendum.

*Small Total Population Size*—Wolverine population densities vary across North America and have been described as naturally low (van Zyll de Jong 1975, p. 434) given the species’ large home range, wide-ranging movements, and solitary characteristics (Service 2018, p. 56). There are far fewer wolverines in the contiguous United States (around 300) than there are in Canada (more than 15,000) and Alaska (likely in the thousands) (Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2014, pp. 36, 47; Inman et al. 2013, p. 282; Service 2018, p. 71), but this is largely a reflection of the amount of suitable habitat available within the contiguous United States (both currently and historically) for a species that needs large, exclusive territories. Even if wolverines occupied all available habitat in the contiguous United States, their populations would still be relatively small compared to Canada (i.e., the population capacity estimate was 644 (95% confidence interval (CI) = 506–1881) (Inman et al. 2013, p. 282). A small population in the contiguous United States would be less of a conservation concern if there were greater connectivity with the larger populations in Canada.

Recent genetic information indicates wolverines from Canada have slowly repopulated the contiguous United States over the past century since the era of unregulated predator removal (Service 2018, pp. 45–50; Sawaya 2023, pers. comm.). We stated in the December 14, 2010, 12-month finding (75 FR 78030) that differences in population sizes between the contiguous United States and Canada were reflective of a difference in conservation status. In our October 13, 2020, withdrawal document (85 FR 64618), based on new information, we concluded that the contiguous U.S. wolverines represent a peripheral



population at the southern extent of the North American wolverine's range. Thus, we considered the small population size of wolverines in the United States to be a natural result of the limited habitat available and not reflective of a difference in conservation status. Our 2020 determination on this point was made with the understanding that there was sufficient connectivity with Canada such that dispersing wolverines could bolster the small population in the contiguous United States. However, new information on wolverine dispersal and genetic connectivity indicates that wolverines appear to be impacted by recent overharvest in Canada, barriers to female wolverine dispersal, and development in dispersal corridors between suitable habitat (Barrueto et al. 2022, p. 4; Sawaya et al. 2023, pp. 12–14; Balkenhol et al. 2020, p. 799). Because of this, the small population in the contiguous United States is more at risk from future threats impacting population resiliency. We now conclude that the difference in population size on the contiguous U.S. side of the international border is a significant difference in conservation status in light of section 4(a)(1)(D) of the Act as it applies to discreteness.

*Effective Population Size*—In our December 14, 2010, 12-month finding (75 FR 78030) and February 4, 2013, proposed listing rule (78 FR 7864), in support of our conclusion that differences in conservation status between the United States and Canada exist that are significant in light of section 4(a)(1)(D) of the Act, we discussed the difference in wolverine effective population size between the contiguous United States and Canada. The 2013 proposed listing rule presented an effective population size estimate for wolverines in the contiguous United States from a publication by Schwartz et al. (2009), which estimated a summed effective population size of 35, with credible limits from 28 to 52 (Schwartz et al. 2009, p. 3,226). As provided in our SSA report (Service 2018, pp. 46–47), effective population sizes ( $N_e$ ) are typically smaller than census population sizes.  $N_e$  is the number of individuals in a population that would result in the same loss of genetic diversity, inbreeding, and genetic drift, if they behaved in the manner of an idealized population (equal sex ratio, random mating, all adults producing offspring, equal numbers of offspring per parent, and a constant number of breeding individuals across generations) (Frankham 1995, p. 96). The concept of

effective population size relates to population viability because, as a general rule, closed populations with random mating that have effective population sizes (1) below 50 are at higher risk of inbreeding depression, and (2) below 500 are more likely to lose genetic variation important to maintaining long-term evolutionary potential. In addition, small, isolated populations are more vulnerable to extinction through interactions between environmental, genetic, and demographic factors (Caughley 1994, pp. 221–227). Importantly, the concept and guidelines for genetically effective population size were developed for a single, isolated population (Laike et al. 2016, p. 280). Fragmentation can further exacerbate inbreeding depression and genetic loss, while connectivity to larger source populations can alleviate the adverse effects of small effective population sizes (Frankham et al. 2014, p. 60).

In our October 13, 2020, withdrawal document (85 FR 64618), we acknowledged the low effective population size of wolverines in the contiguous United States but found this was not a concern given the evidence of genetic connectivity between the United States and Canada. We stated the currently known spatial distribution of genetic variability in wolverines in North America appeared to be a reflection of a complex history where population abundance has fluctuated since the time of the last glaciation and insufficient time has passed since human persecution for a full recovery of wolverine densities (Cardinal 2004, pp. 23–24; Zigouris et al. 2012, p. 1,554). Zigouris et al. (2012, p. 1,545) posit that the irregular distribution of wolverines in the southwestern periphery and the genetic diversity observed in those analyses is a result of population bottlenecks that were caused by range contractions from a panmictic (random mating) northern core population approximately 150 years ago coinciding with human persecution. We stated that very few successful migrants are needed per generation to maintain at least 95 percent of the genetic variation in the next 100 generations (approximately 750 years) in the contiguous United States (Cegelski et al. 2006, p. 209). We concluded that this level of migration from the north had already been occurring following the end of intense predator removal campaigns that affected this subspecies. Given observations of wolverines moving vast distances over varied terrain and across the U.S.–Canada border, our assessment of the low levels of trapping mortality

in Canada near the border, and further confirmation of Canada as the source of wolverine genetics present in contiguous U.S. wolverines, we believed that wolverines in the contiguous United States were not separated genetically from the larger population in Canada. In our October 13, 2020, withdrawal document (85 FR 64618), we concluded that wolverines in the contiguous United States exhibit genetic and phenotypic similarities with wolverines in Canada that implied connectivity with Canada. As such, we concluded in that withdrawal document that it was not biologically appropriate to consider the low effective population size of wolverines on the contiguous U.S. side of the border as a difference in conservation status that is significant in light of section 4(a)(1)(D) of the Act as it applies to discreteness.

In our 2023 wolverine SSA report addendum, we summarized our evaluation of the available information related to the effective population size of wolverines in the contiguous United States, recent trapping/harvest in Canada, and genetic connectivity of wolverines between the United States and Canada. We are not aware of any new estimates of effective population size for wolverines in the contiguous United States; therefore, the  $N_e$  estimate of the wolverine population in the Northern Rocky Mountains (35) provided by Schwartz et al. (2009) represents the best available scientific information regarding effective population sizes in the U.S. portion of the Northern Rocky Mountains (Service 2023, p. 27). In the 2023 wolverine SSA report addendum, we estimated the effective population size of the wolverine population in the North Cascade Mountains, resulting in an estimate of  $N_e = 4$  (Service 2023, p. 27). When viewed in isolation, the overall effective population sizes for wolverines in the contiguous United States are under the conservation thresholds for short- and long-term genetic health (50 and 500, respectively). New information suggests recent trapping harvest in southwestern Canada resulted in population declines in some areas that may be important sources of dispersing individuals to the contiguous United States (Service 2023, pp. 41–42). Furthermore, new information shows that female wolverine movement is influenced by major transportation corridors and that the Trans-Canada Highway could be an impediment to female movement (Service 2023, p. 28). Overall, the effective population size estimates of wolverines in the contiguous United States are small

compared to conservation rules-of-thumb and presumably smaller than the effective population size of wolverines in Canada. Only one or two migrants per generation are likely needed to achieve genetic population connectivity (Cegelski et al. 2006, p. 13); however, based on new information on gene flow and dispersal, we cannot assume this level of immigration from Canada is occurring. The contiguous U.S. population may be at risk of impacts from low effective population size without sufficient gene flow with Canada. We now conclude that the difference in effective population size on the U.S. side of the international border results in a significant difference in conservation status in light of section 4(a)(1)(D) of the Act as it applies to discreteness.

**Habitat Fragmentation**—In our December 14, 2010, 12-month finding (75 FR 78030) and February 4, 2013, proposed listing rule (78 FR 7864), we stated that wolverine habitat in the contiguous United States consists of small, isolated areas of high-elevation habitat separated from each other by low valleys of unsuitable habitat. We also described that these ‘habitat islands’ are represented by areas containing spring snow, citing Copeland et al. (2010). We concluded that the fragmented nature and distribution of wolverine habitat in the contiguous United States results in a population that is highly vulnerable to extirpation because of lack of connectivity between subpopulations, and this also makes them more vulnerable to external threats (75 FR 78030; December 14, 2010). This was used to support our justification for discreteness.

The breeding range of wolverines in the contiguous United States largely exists in high-elevation alpine forested habitats. Those alpine areas with established wolverine home ranges are separated by expanses of lower elevation valley habitats that are not conducive to wolverine home range establishment but do provide varying levels of connectivity between home ranges or subpopulations. In Canada and Alaska, habitats are more contiguous and much less fragmented than wolverine habitat in the contiguous United States. The fragmented nature and distribution of wolverine habitat in the contiguous United States puts wolverines occurring in the contiguous United States at higher risk of impacts from climate change and other stressors compared to wolverines occurring in Canada and Alaska. We conclude that the difference in habitat fragmentation on the contiguous U.S. side of the international border results in a

significant difference in conservation status in light of section 4(a)(1)(D) of the Act as it applies to discreteness.

#### Discreteness Based on the International Border—Differences in Regulatory Mechanisms

Wolverines are currently protected under various State regulatory designations in the States where the species occurs in the western United States (Service 2023, table 10). In Canada, provincial designations for the wolverine include endangered in Labrador, and threatened in Ontario and Québec (“threatened” is equivalent to endangered in Québec), with the remaining provincial designations ranging from no ranking to sensitive or special concern to the Vancouver Island population’s designation as imperiled (COSEWIC 2014, p. 44).

Current regulatory mechanisms prohibit trapping or harvest of wolverines in the contiguous United States, while trapping is legal in Canada and occurs in parts of the range that could be a source of important dispersers to the contiguous United States. We acknowledge that there is currently a trapping moratorium in a portion of British Columbia resulting from studies showing population declines in that area related to trapping (Service 2023, pp. 44–45). However, that moratorium is temporary and only covers a portion of the Canadian range (e.g., it does not include Alberta). As discussed above, there are significant differences in control of exploitation that may be impeding movement of wolverines, from Canada to the contiguous United States. We conclude that there are differences in regulatory mechanisms related to control of exploitation between the United States and Canada that are significant in light of section 4(a)(1)(D) of the Act.

#### Discreteness Conclusion

Based on our updated analysis described above and supported by information in the wolverine SSA report and the wolverine SSA report addendum, the contiguous U.S. population of the North American wolverine meets the discreteness criterion in our DPS policy (61 FR 4722; February 7, 1996). It is delimited by the international boundary with Canada, given differences in control of exploitation, conservation status, and regulatory mechanisms that are significant in light of section 4(a)(1)(D) of the Act. After determining that a vertebrate population is discrete, we are required to complete an analysis to determine if the population in question

is significant according to our DPS policy; that analysis follows.

#### Analysis of Significance

If we determine a population segment is discrete, its biological and ecological significance will then be considered in light of Congressional guidance that the authority to list DPSs be used sparingly while encouraging the conservation of genetic diversity. In carrying out this examination, we consider available scientific evidence of the population’s importance to the taxon to which it belongs (*i.e.*, the North American wolverine). Our DPS policy states that this consideration may include, but is not limited to: (1) persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon; (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range; or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. Below, we address considerations 1, 2, and 4. Consideration 3 does not apply to the continental U.S. wolverine population because North American wolverines are distributed widely across Alaska and Canada.

In our December 14, 2010, 12-month finding (75 FR 78030), we conducted an exhaustive analysis of the significance of the contiguous U.S. population of the North American wolverine; this analysis was incorporated by reference into our February 4, 2013, proposed listing rule (78 FR 7864). In the analysis, we concluded that the wolverine population in the contiguous United States is significant because its loss would result in a significant gap in the range of the taxon. In our October 13, 2020, withdrawal document (85 FR 64618), we did not present an assessment of significance under the DPS policy because, at that time, we determined that the wolverine population in the contiguous United States was not discrete, and thus there was no need to assess significance. Because we have now determined the wolverine population in the contiguous United States is discrete, we reviewed and present an update to our 2010 and 2013 assessment of the significance of the wolverine population occurring in the contiguous United States using the best available information.

#### Unusual or Unique Ecological Setting

Wolverines occupy a variety of habitats within North America, including Arctic tundra, subarctic-alpine tundra, boreal forest, mixed forest, redwood forest, and coniferous forest (Banci 1994, p. 114). Wolverines in the contiguous United States exist in an ecosystem that includes high-elevation, remote, rugged, alpine forested terrain and non-forested habitats around the tree line that retain snowpack into the spring. The ecoregions inhabited by wolverines in the contiguous United States are also present in large portions of their occupied range in Canada and Alaska (Service 2018, appendix A).

Wolverines in the contiguous United States appear to use habitat attributes that are similar to wolverine populations in Canada and Alaska, where wolverines also use alpine habitats, and do not appear to exist in an unusual or unique ecological setting. Thus, we again do not rely on this factor when determining that the wolverine in the contiguous United States is significant to the taxon as a whole.

#### Significant Gap in the Range of the Taxon

Wolverines once lived throughout the North American Rocky Mountains from Alaska and Canada, south through Colorado and into New Mexico, and in the North Cascades of Washington and the Sierra Nevada Range of California. During the late 1800s and early 1900s, the wolverine population declined or was extirpated in much of the contiguous United States (Service 2018, p. 1). Wolverines have since recolonized parts of the contiguous United States, and the current breeding range includes the Southern Rocky Mountains of Idaho, Montana, and Wyoming and the Cascades of Washington (Service 2023, figure 3). Individual wolverines have been documented in California, Colorado, Oregon, and Utah; however, breeding populations are not known to exist in these areas. The contiguous United States represents the southernmost extent of the wolverine's range in North America.

Our significance determination in the December 14, 2010, 12-month finding (75 FR 78030) concluded that the loss of wolverines in the contiguous United States would result in a significant gap in the range of the taxon. This determination was based on an estimate of the historical range (not current range) of wolverine in the contiguous United States. This relied on a latitudinally-based interpretation of historical range in the contiguous

United States, the majority of which was unoccupied at the time the estimation was made and remains unoccupied by wolverines. We stated in 2010 that the loss of the population in the contiguous United States would be significant because it would substantially curtail the range of the wolverine by moving the southern range terminus approximately 15 degrees latitude to the north (or approximately 40 percent of the presumed latitudinal extent of the wolverine's range in North America). For reference, the U.S. border with Canada is 49 degrees North latitude. Fifteen degrees south of the border (at 34 degrees North latitude), the assumed 15-degree gap in latitude (49 degrees North minus 34 degrees North) presented in the DPS analysis in the December 14, 2010, 12-month finding (75 FR 78030), lands on 34 degrees North latitude, which runs through western States, including southern California and approximately the middle of Arizona and New Mexico, significantly south of the currently occupied range of wolverine in United States.

During the development of our 2018 wolverine SSA report and 2023 SSA report addendum, we conducted an extensive analysis of the recent and historical occurrence records for wolverines in the contiguous United States (Service 2018, pp. 12–16; Service 2023, pp. 3–14). Our updated significance analysis is based on an updated, spatially explicit assessment of the current range of wolverines in the contiguous United States. We used the current range (Service 2023, figure 2) to provide a more accurate reflection of the range currently being used by populations of wolverines in the contiguous United States supported by the best available information. By focusing on the current range, and not the historical range, we avoid including large sections of the western United States that do not have high-quality wolverine habitat (southern California and northern Arizona and New Mexico) in our significance analysis, and thus we are able to better assess the significance of the population in the contiguous United States relative to the larger taxon. The current range of wolverines in the contiguous United States covers approximately 58,998,140 acres (238,757 km<sup>2</sup>) of high-quality wolverine habitat with recent wolverine occurrences (from 2009–2023) (Service 2023, figure 2), the loss of which would move the southern range terminus approximately 12 degrees latitude to the north.

Furthermore, the southernmost portion of the range may be important

for conservation, as it may allow for unique adaptive potential in the face of a changing global climate and future reduction in cold and snowy conditions. Populations on the periphery of species' ranges tend to be given lower conservation priority because they are thought to exist in low-quality habitats and are also thought to be the populations that are least likely to survive a reduction in range (Wolf et al. 1996, p. 1147). However, this tendency presumes that the ultimate cause of the species' extinction will be one that operates by eroding away the species' range beginning at the periphery and progressing to the center. This presumption is based on biogeographical information that habitat and population densities of species are highest near the center of the species' range and decline near the edge (Brown and Lomolino 1998, figure 4.16). Data from documented range collapses of species from around the world, however, illustrate that species' ranges tend to collapse to peripheral areas rather than to the center of their historical ranges (Lomolino and Channell 1995, p. 342; Channell and Lomolino 2000, pp. 84–86). Of 96 species whose last remnant populations were found either in the core or periphery of their historic ranges (rather than some in both core and periphery), 91 (95 percent) of the species were found to exist only in the periphery, and 5 (5 percent) existed solely in the center (Channell and Lomolino 2000, p. 85). Available scientific data support the importance of peripheral populations for conservation (Fraser 1999, entire; Lesica and Allendorf 1995, entire).

Based upon the loss of approximately 58,998,140 acres (238,757 km<sup>2</sup>) of high-quality wolverine habitat from the southern extent of the range and the adaptive potential that part of the range may provide against upcoming climate change impacts, and a 12 degree latitudinal gap in the North American wolverine's range that would result if the U.S. population was lost, we determine that the loss of the contiguous U.S. wolverine population would result in a significant gap in the range of the taxon. Thus, the DPS meets the definition of significant in our DPS policy.

#### Marked Genetic Differences

In the contiguous United States, small, isolated wolverine populations are likely dependent on gene flow from Canada for population persistence (Cegelski et al. 2006, pp. 208–209; McKelvey et al. 2014, entire). In the Northern Rocky Mountains, the best available genetic data indicate genetic

structuring of populations despite some dispersal (Cegelski et al. 2006, pp. 204–205, 208; Sawaya et al. 2023, pp. 12–14). Genetic structuring reflects the amount of interbreeding between different groups of an organism where more structure indicates less interaction between groups, increased genetic isolation, increased potential for inbreeding, and lower genetic diversity. Given the relatively recent recolonization of wolverines in the contiguous United States from Canada (within the last 60–70 years), nuclear genetic diversity was lower in the southern periphery of the subspecies' range in the south (Sawaya et al. 2023, pp. 9–11). Nuclear DNA analyses indicated differences in allele frequencies between the United States and Canada along the Rocky Mountains, with some areas of overlap in wolverine populations straddling the border due to male-mediated gene flow. Females appear to be segregated near the international border due to their higher rates of philopatry (the tendency of an animal to remain in or return to the area of its birth) than males and their apparently greater tendencies to avoid crossing major roadways, including the Trans-Canada Highway (Highway 1) and the Crownsnest Highway (Highway 3) in southern British Columbia (Sawaya et al. 2023, pp. 12, 17). Both highways were opened in the 1960s (British Columbia Ministry of Transportation and Highways 2001, pp. 16, 20). Since then, they have been widened in many areas, and traffic volumes have substantially increased (British Columbia Ministry of Transportation and Highways 2001, pp. 7–11, 16–21). Mitochondrial DNA patterns in the Rocky Mountains showed no unique contemporary maternal lineages detected south of the international border, which is consistent with observational data indicating that wolverines recolonized the contiguous United States from Canada within the last 60–70 years (Sawaya et al. 2023, pp. 2, 16–17). Substantially lower mitochondrial DNA diversity in the United States, as compared to mitochondrial DNA diversity in Canada, is consistent with the nuclear DNA signals of limited contemporary female gene flow between the countries along the Northern Rocky Mountain range and the wolverine's relatively recent recolonization at the southern edge of their range (Sawaya et al. 2023, p. 17).

In the North Cascades, global positioning system (GPS) tracking data show that wolverines in western Washington and southern British Columbia form a small transboundary

population (Aubry et al. 2023, p. 4). Preliminary results from a large population genetics study of this transboundary population show that wolverines in the North Cascades are genetically isolated from other wolverine populations in the United States and Canada and likely went through a genetic bottleneck with few founders (Sawaya 2023, pers. comm.). The population has low heterozygosity (less than 0.5) and could be experiencing some level of inbreeding (Sawaya 2023, pers. comm.). However, there are no indications or evidence that individuals or population dynamics are being adversely affected by inbreeding depression (Sawaya 2023, pers. comm.).

As part of the multi-State wolverine occupancy surveys in 2016–2017, researchers obtained 240 wolverine DNA samples (Lukas et al. 2020, p. 846). These samples represented 26 unique females and 24 unique males (Lukas et al. 2020, p. 846). Analyses of the mitochondrial DNA control region revealed regional structuring (*i.e.*, regional grouping), with all of the samples in Idaho, Montana, and Wyoming assigned to Haplotype Wilson A (the most abundant haplotype in North America) and all of the samples in Washington assigned to Haplotype Wilson C (Lukas et al. 2020, p. 846). These results are consistent with the latest genetic analysis from the large transboundary study (Sawaya et al. 2023, entire) and previous mitochondrial DNA studies showing that the Northern Rocky Mountains and North Cascades do not appear to share any contemporary haplotypes (McKelvey et al. 2014, p. 328).

The genetic differences between the contiguous United States and Canada consist of lower genetic diversity in the United States, a difference that is a reflection of the recent recolonization of wolverines into the contiguous United States from Canada over the last century. There are no unique haplotypes present in contiguous U.S. wolverines that are not already present in larger populations in Canada and Alaska. As we noted in our analysis in the December 14, 2010, 12-month finding (75 FR 78030), this is not the kind of genetic difference that would lead us to conclude that a population is significant under our DPS policy. The DPS policy is designed to ensure the protection of important components of a species' evolutionary legacy rather than populations that simply have lower genetic diversity due to recent recolonization from a larger source population. Therefore, as in our 2010 analysis, we do not find marked genetic

differences as a basis for determining significance for this DPS.

#### Summary for Significance

We evaluated whether the discrete population segment of wolverines in the contiguous United States is also significant, considering factors such as whether the population segment is in an ecological setting unusual or unique for the taxon; whether the loss of the discrete population segment would result in a significant gap in the range of a taxon; whether the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range; or whether the discrete population segment differs markedly from other populations of the species in its genetic characteristics. We conclude that the wolverine population in the contiguous United States is significant because its loss would result in a significant gap in the range of the taxon.

#### DPS Conclusion

Based on the best available information, we conclude that the population of wolverines in the contiguous United States is discrete and significant in relation to the remainder of the subspecies in North America. As a result, the population of wolverines in the contiguous United States is a listable entity under section 3(16) of the Act.

The DPS policy sets forth a three-step process for determining whether a vertebrate population as a separate entity warrants listing: (1) Determine whether the population is discrete; (2) if the population is discrete, determine whether the population is significant to the taxon as a whole; and (3) if the population is both discrete and significant, then evaluate the conservation status of the population to determine whether it is endangered or threatened. We have determined that wolverines in the contiguous United States qualify as a DPS and, therefore, are a listable entity. Below, we provide a status determination of the wolverine DPS in the contiguous United States.

#### Summary of Biological Status and Threats

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

In preparing the 2018 wolverine SSA report and the 2023 SSA report addendum, we reviewed available reports and peer-reviewed literature, incorporated survey information, and

contacted species experts to collect additional unpublished information for the North American subspecies (*Gulo gulo luscus*). We identified uncertainties and data gaps in our assessment of the current and future status of the subspecies. We also evaluated the appropriate analytical tools to address these gaps, consulted with species experts, prepared updated maps of the known subspecies' distribution and breeding range in the contiguous United States, and evaluated new models of spring snow. In some instances, we used publications and other reports (primarily from Fenno-Scandinavia) of the Eurasian subspecies (*G. g. gulo*) as a surrogate in completing our status assessment.

Since the publication of the October 13, 2020, withdrawal document (85 FR 64618), more than 180 new publications have been issued (see list of citations in the 2023 wolverine SSA report addendum). This is a substantial amount of new information for a difficult-to-study animal like the wolverine and has added significantly to our understanding of wolverine biology. This new information has also highlighted new insights into the subspecies' biological needs, threats, and the wolverine's interactions with abiotic and biotic habitat features.

We also conducted an updated geospatial analysis to map verified wolverine occurrences and approximate breeding ranges in the contiguous United States. This was informed by recent multi-State monitoring data (Lukas et al. 2020, entire; Mosby et al. 2023, entire).

Our updated analyses, since the publication of the October 13, 2020, withdrawal document, of the current and predicted future condition for the wolverine is presented in the wolverine SSA report addendum and summarized here. Our future-condition analysis includes the potential conditions that the subspecies or its habitat may face in the future. This includes consideration of threats most likely to impact the subspecies at the population or rangewide scales in the future, including potential cumulative impacts. The spatial expansion to our climate analysis is a major improvement from the snow projections used in our 2018 SSA report, which focused only on Rocky Mountain National Park (Colorado) and Glacier National Park (Montana). We now focus on five modeling domains that overlap with occupied and potential wolverine habitat in the contiguous United States across latitudinal, longitudinal, and elevation gradients. These include: (1) Cascades (Washington); (2) Northern

Rocky West (Washington, Idaho, and Montana); (3) Northern Rocky (Idaho and Montana); (4) Mid-Rocky (Idaho, Montana, and Wyoming); and (5) Southern Rocky (Colorado and New Mexico) (Service 2023, p. 49). In our updated climate assessment, we use a timeframe out to end of century for assessing future effects to North American wolverine viability from climate change and other threats. Beyond 2100, climate modeling uncertainty increases substantially. Our previous assessment considered in the October 13, 2020, withdrawal document (85 FR 64618) looked at a timeframe 50 years into the future. We conclude that end of century is a reasonable timeframe, as it includes the potential for observing these effects over several generations of the wolverine.

As discussed above in *Analytical Framework*, we consider what the subspecies needs to maintain viability by characterizing the status of the subspecies in terms of resiliency, redundancy, and representation (Wolf et al. 2015, entire). Resiliency is having sufficiently large populations for the subspecies to withstand stochastic events (arising from random factors). We can measure resiliency based on metrics of population health (for example, birth versus death rates and population size). Resilient populations are better able to withstand disturbances such as random fluctuations in birth rates (demographic stochasticity), variations in rainfall (environmental stochasticity), or the effects of anthropogenic activities.

Redundancy is having a sufficient number of populations for the subspecies to withstand catastrophic events (such as a rare destructive natural event or episode involving many populations). Redundancy is about spreading the risk and can be measured through the duplication and distribution of populations across the range of the subspecies. The greater the number of populations a subspecies has distributed over a larger landscape, the better it can withstand catastrophic events.

Representation is having the breadth of genetic makeup of the subspecies to adapt to changing environmental conditions. Representation can be measured through the genetic diversity within and among populations and the ecological diversity (also called environmental variation or diversity) of populations across the subspecies' range. The more representation, or diversity, a subspecies has, the more it is capable of adapting to changes (natural or human-caused) in its environment. In the absence of subspecies-specific genetic and ecological diversity information, we

evaluate representation based on the extent and variability of habitat characteristics within the geographical range.

#### *Life-History Needs*

Wolverine populations are characterized by naturally low densities. The species is highly territorial, with very little overlap between same-sex adults. Wolverines occupy a variety of habitats, but generally select habitat in locations away from human settlements and activities. The wolverine is a snow-adapted, cold-climate animal in its physiology and morphology (Telfer and Kelsall 1984, p. 1830); phylogeography (historical processes that may be responsible for past and present geographic distributions of genealogical lineages); and behavior and habits (Fisher et al. 2022, p. 7).

Wolverines consume a variety of food resources, and seasonal switching of prey is commonly observed. Unlike wolverine populations in Eurasia, wolverines in the contiguous United States rarely prey on livestock. During our extensive literature review in preparing the 2023 wolverine SSA report addendum, we discovered only two instances of wolverine depredation in the United States since our 2018 SSA report; one wolverine that had depredated sheep in Utah, and another that was caught in a chicken coop in Washington (Service 2023, pp. 10, 38).

Wolverine reproduction includes the following characteristics: polygamous behavior (*i.e.*, male mates with more than one female each year), delayed implantation (up to 6 months), a short gestation period (30–40 days), denning behavior (only observed in snow in the contiguous United States), and several additional months of maternal care (Service 2018, p. 22). The reproductive behavior in wolverines is temporally adapted to take advantage of the availability of food resources, limited interspecific competition, and snow cover in the winter.

In our 2018 wolverine SSA report, we defined the physical and ecological requirements of wolverine in the contiguous United States (see (1), (2), and (3), below). In light of new information regarding wolverine habitat associations that provides support for the wolverine's strong preference for areas with cold and snowy conditions, we have added a fourth ecological requirement (see (4), below). The requirements are:

(1) Large territories in relatively inaccessible landscapes, at high elevation (1,800 to 3,500 m (5,906 to 11,483 ft));

(2) Access to a variety of food resources that vary with seasons;

(3) Physical/structural features (*e.g.*, talus slopes, rugged terrain) linked to reproductive behavioral patterns; and

(4) Habitats characterized by the presence of persistent spring snow (of greater than or equal to 1 meter on May 1) for survival and reproduction.

Our 2023 wolverine SSA report addendum affirms these requirements and the species characterization in our 2018 SSA report.

#### Habitat

Research published since our 2018 wolverine SSA report confirms that broad-level habitat selection (subspecies' range, individual home range) at the southern edge of the wolverine's distribution can be accurately predicted using a small number of high-elevation variables and terrain features (Carroll et al. 2021a, pp. 1470–1471; Aubry et al. 2023, p. 7). New evidence from around the world reinforces that snow—especially persistent spring snow—is an important predictor of broad-scale wolverine distribution and density (Aubry et al. 2023, pp. 15–16; Carroll et al. 2020, p. 8; Fisher et al. 2022, p. 10; Glass et al. 2021, entire; Mowat et al. 2020, p. 220). Within home ranges, the precise nature of the relationship between wolverine space-use and snow is complex, involving multiple snow characteristics (*e.g.*, density, depth, and melt), various phases of the wolverine lifecycle (*e.g.*, denning, feeding and food caching, within-territory movements, and dispersal) and sex-specific habitat selection (Carroll et al. 2021, p. 1469; Glass et al. 2021, entire; Heinemeyer et al. 2019, p. 16). While wolverines appear capable of occupying and reproducing in areas without persistent spring snow in some ecological contexts, at a continent-wide scale, wolverine dens outside of areas with persistent spring snow have thus far only been documented to occur in colder boreal or arctic environments in Canada and Alaska (Aronsson and Persson 2017, p. 266; Copeland et al. 2010, pp. 240–242; Fisher et al. 2022, p. 8; Jokinen et al. 2019, pp. 6–8; Webb et al. 2016, pp. 1466–1467).

In the Greater Yellowstone Ecosystem, distance to high-elevation talus, snow water equivalent (a surrogate for snow depth), and latitude-adjusted elevation were the most important environmental factors explaining selection of wolverine home ranges and habitats within home ranges (Service 2023, p. 16). These habitat variables are also known to be important in defining the wolverine's distribution (Inman et al. 2013, p. 278).

Results from dispersal suitability models developed for wolverines indicate that isolation by landscape resistance (areas that individuals are less likely to traverse due to high energy, mortality, or other biological costs) explained more of the variation in wolverine genetic differences than did isolation by distance (Balkenhol et al. 2020, pp. 795–797). This means that wolverines are moving non-randomly across the landscape in association with specific landscape features. Snow depth (average 1-year snow depth at 1-km<sup>2</sup> resolution), terrain ruggedness (measure of how jagged or flat the terrain is on average), and housing density (census block housing density per 1 km<sup>2</sup>) best predicted gene flow in wolverines (Balkenhol et al. 2020, pp. 795–797). Snow depth was the most important variable for explaining variation in genetic differences overall (Balkenhol et al. 2020, p. 790). At broad spatial scales, housing density and terrain ruggedness were the most important factors, where wolverines avoided areas of high housing density and preferred areas of terrain ruggedness, which explains the variation in wolverine genetic differences (Balkenhol et al. 2020, p. 790).

In the Cascade Range in southern British Columbia and Washington, three climatic variables (proximity to the transitional zone near the alpine tree line, number of frost-free days per year, and annual precipitation as snow) were correlated with wolverine location data (Aubry et al. 2023, p. 10). Wolverine distribution in the Cascades is constrained by climatic conditions; snowy, cold environments delimit the areas that are “overwhelmingly associated with resident wolverines” (Aubry et al. 2023, p. 16). The highest-use areas were on the eastern side of the Cascades, where alpine habitats had fewer frost-free days (Aubry et al. 2023, p. 15). This is consistent with other models, indicating that wolverines rely on the transitional zone between the tree line, below which environmental conditions become too warm, and upper elevations of permanent ice and snow, where there is insufficient food and cover to support basic life-history requirements for wolverines (Aubry et al. 2023, pp. 13–14).

A study using GPS location data on 38 wolverines from 2001 to 2010 analyzed wolverine home range habitat selection across the western United States by identifying landscape variables that were highly correlated with wolverine home ranges (Carroll et al. 2020, entire). The resource selection function model included landform (*e.g.*, ridges and peaks), vegetation classification,

distance to high-elevation talus, latitude-adjusted elevation, average monthly snow water equivalent, and human modification (Carroll et al. 2020, p. 8). Core areas were identified, and connectivity was assessed, between these core areas using a landscape resistance model, validated with GPS location data from dispersing wolverines (Service 2023, figure 3). Results showed that resident wolverines in core habitats are far more sensitive to low-quality habitat than are dispersing individuals, but that dispersers still follow lower-resistance pathways that connect higher quality core habitats (Carroll et al. 2020, p. 9). Another study modeled within-home range habitat selection by wolverines in areas of the Northern Rocky Mountains with high amounts of winter backcountry recreation and found significant differences in male and female habitat selection (Heinemeyer et al. 2019a, p. 9). The best model for male wolverines included distance to roads and proportion of lower elevation grass and shrub cover, while the best model for female wolverines included talus, persistent spring snow cover (defined in the cited studies as snow cover present between April 24 and May 15), and forest edge-to-area covariates (Heinemeyer et al. 2019a, p. 9). Best models for both sexes included covariates for topographic position index, quadratic form of slope, distance to forest edge, solar insolation, and percentage cover of forest, riparian, and montane open cover types. This study also showed that wolverines are negatively affected by winter recreation (see *Disturbance Due to Winter Recreational Activity*, below).

Multiple recent studies in Canada have provided further evidence of the influence of snow cover and human development/disturbance on wolverine distribution. Wolverine density in and around a national park complex in the southern Canadian Rocky Mountains was three times higher within these national parks than outside them, increased with spring snow cover, and decreased with increasing night light intensity (a measure of human development) (Barrueto et al. 2022, p. 4). Along the Front Range of the Canadian Rocky Mountains, wolverines selected areas with natural land-cover and high snow cover and avoided anthropogenic features and heterospecific competitors (Heim et al. 2019, pp. 2499–2502). In the Rocky Mountains of Alberta, wolverine occurrence in space and time was best explained by coyote (*Canis latrans*) occurrence and the density of linear

disturbance features (e.g., roads, pipelines, seismic lines, motorized and nonmotorized recreational trails), with both of these factors decreasing the likelihood of wolverine occurrence (Chow-Fraser et al. 2022, pp. 4–5). In the southern Canadian Rockies, wolverine density was found to be positively correlated with the number of years of persistent spring snow cover and negatively correlated with road density (Clevenger 2019, p. 62; Mowat et al. 2020, pp. 218–219). Female densities in areas with more cumulative years of persistent spring snow were higher than male densities, which suggests there may be a preference for snowy areas when denning. An additional study, also in the Canadian Rockies, found that food availability and human disturbance were major drivers of wolverine distribution in winter (Kortello et al. 2019, p. 7). Persistent spring snow was an important factor in explaining the variation in female wolverine distribution in winter and overall wolverine distribution at coarse scales (Kortello et al. 2019, p. 8). The researchers concluded that their results “do not reject the hypothesis that wolverine occurrence is constrained by an obligate association with persistent spring snow” (Aubry et al. 2007, p. 2154; Copeland et al. 2010, p. 244), “but do suggest the alternative explanation that the relationship between spring snow and wolverine distribution could be functionally related to the distribution of food, disturbance or mortality risk” (Kortello et al. 2019, p. 8). We agree with their assessment and acknowledge the precise causal mechanism(s) for the apparent association of wolverine distribution and persistent spring snow are not yet clear. There may be a number of factors acting in concert to drive the wolverine’s preference for cold and snowy conditions, and we have attempted to account for this in our analysis presented in this rule.

A habitat selection study of 21 adult, non-denning wolverines (11 female, 10 male) fitted with GPS collars in the Alaskan Arctic found that wolverines generally selected more rugged areas closer to streams, rivers, and lakes (Glass et al. 2021, p. 893). This study also showed that snow characteristics are important to wolverines for reasons other than solely creating reproductive dens. Specifically, they found that non-denning wolverines select deeper, denser snow, but only when that snow is not undergoing melt (Glass et al. 2021, pp. 894–895). The wolverine’s observed preference for denser snow might be a function of both ease of

movement across the surface, as well as the ability of denser snow to maintain snow cavities and tunnels (Glass et al. 2021, p. 895).

*Denning Habitat*—Denning habitat has been a focus for wolverine conservation because wolverines have naturally low reproductive rates. Impacts to denning habitat could have important consequences for demographic rates (Fisher et al. 2022, p. 8). There is growing evidence that wolverines rely on subnivean space (the environment between snow and terrain) for thermoregulation, to escape predation risk, and/or to cache food (van der Veen et al. 2020, pp. 8–10; Fisher et al. 2022, p. 10). Although wolverines have been documented denning in areas without persistent spring snow (Fisher et al. 2022, p. 8; Persson et al. 2023, entire), this phenomenon appears to be associated with cold, high-latitude boreal or arctic forests rather than the alpine habitats used by wolverines in the contiguous United States. In the contiguous United States, there is no evidence that wolverines have denned in areas without persistent spring snow.

Den-shifting behavior represents a tradeoff between moving—and risking potential energy loss and harm to offspring—versus staying in the original den site and risking exposure to disturbance or changed conditions, such as melting snow, that might make the original den site unsuitable (Heeres 2020, p. 9). In a study in northern Sweden focusing on 18 adult female wolverines fitted with GPS collars over an 11-year period and occupying 271 den sites, Heeres (2020, p. 15) determined that a female used an average of 12 den sites during a single denning season (range: 4–28; median: 10). Additionally, female wolverines had a higher probability of shifting den sites in forested habitats, compared to alpine habitats, which is likely a result of earlier snow melt in forests that may make den sites uninhabitable early in the season (Heeres 2020, p. 20). Other factors related to den-shifting behavior included the level of denning experience of the female wolverine, which was quantified as the number of previous reproductive attempts by an individual (lower den-shift probability), temperature (higher den-shift probability in the warmer forested habitats; nonsignificant den-shift probability in alpine habitat), food resource availability (higher den-shift probability, which could be related to accessing food or increased human presence), and cub age (more shifting as cubs mature and are able to move to

food resources) (Heeres 2020, pp. 20–22).

In certain ecological contexts, individual wolverines and reproductive dens can exist in areas without substantial spring snowpack (Persson et al. 2023, p. 10; Jokinen et al. 2019, pp. 4–9). For example, Jokinen et al. (2019, pp. 6, 10) observed seven of eight wolverine dens (three primary and five secondary dens) in hollows of uprooted trees and not in snow; however, the researchers acknowledged that sample sizes were small and limited their ability to draw robust conclusions. Jokinen et al. (2019, p. 12) speculated that wolverines, in the absence of spring snow in Alberta, were able to meet their physiological needs through locally available features such as the cavity created by partially uplifted root masses, the thermal properties of thick moss, and the caching opportunities provided by deep peat accumulations. Wolverines are resourceful and may be more flexible in their denning requirements than documented by studies in other landscapes (Persson et al. 2023, p. 10; Jokinen et al. 2019, p. 12; Glass et al. 2021, entire); however, it is also apparent that boreal forest communities have a series of unique properties conducive to wolverine denning, including cold spring temperatures and dense peat layers that might aid in insulating the den (Jokinen et al. 2019, p. 12).

At present, it remains uncertain whether the alpine ecosystems in the contiguous United States contain environmental conditions that would allow wolverines to switch denning behavior or use smaller or shallower patches of snow in response to changes in future snow under a changing climate. Even if they were able to make this shift, snow may be important to wolverines for more than just denning.

*Food Caching*—Wolverines are physiologically and behaviorally adapted to caching perishable food in snow, boulders, and peat bogs for short- or long-term storage (van der Veen et al. 2020, pp. 2–3). In Scandinavia, wolverines cached food all year from scavenging and predation events, with the locations of food caches widely distributed across their home ranges (van der Veen et al. 2020, pp. 6–8). When caching, wolverines selected steep and rugged terrain in unproductive habitat types (habitats with fewer plants and animals) or in forest, indicating a preference for less-exposed sites that can provide cold storage or protection against pilferage. The observed year-round investment in caching by wolverines suggests that food predictability is important for their

survival and reproductive success. Increasing temperatures caused by climate change may provide new challenges for wolverines in at least two ways: (1) by decreasing the shelf-life of cached food, and (2) by increasing competition from pilferers that benefit from a warmer climate (van der Veen et al. 2020, pp. 8–10).

#### *Areas of Uncertainty for Wolverine Habitat Needs*

The precise causal mechanism(s) for the apparent association of wolverine distribution and persistent spring snow are not yet clear. Hypotheses for this association include the importance of snow to create dens (Copeland et al. 2010, entire), the advantages of snow for catching prey within a wolverine's metabolic limits (Young et al. 2012, pp. 224–226), competitive advantages over other scavengers and predators in snow-covered areas (Service 2018, p. 6), thermoregulation (Service 2018, pp. 7–8), food storage and refrigeration (Inman et al. 2012, p. 640), or some combination of these factors. The interplay of temperature and persistence of spring snow and the point at which temperature becomes limiting is also unknown.

There is presumably some limit in appropriate habitat availability at which wolverines will not cross certain habitats or traverse certain barriers, but that threshold is not known. Understanding this threshold for females is particularly important because they often disperse shorter distances than males and appear to be more affected by potential barriers to movement, such as large multi-lane highways (e.g., Sawaya et al. 2019, pp. 621–623).

Recent studies from Canada and Alaska have shown that apex predators and sympatric mesocarnivores (small to mid-sized carnivores that occur in the same area) can influence wolverine space use (e.g., Heim et al. 2019, pp. 2499–2504; Frey et al. 2020, pp. 1133–1137; Bell 2021, pp. 46–47; Klauder et al. 2021, p. 569; Chow-Fraser et al. 2022, p. 4). In addition, it is possible that competitors such as coyotes that thrive within human-dominated landscapes could potentially displace wolverines in areas with substantial anthropogenic disturbance (Chow-Fraser et al. 2022, pp. 4–5). However, the influence of apex predators and intraguild competition on wolverine distribution, abundance, and dispersal in the contiguous United States remains largely unstudied.

#### *Threats*

A species may be determined to be an endangered or threatened species due to

one or more of the five factors described in section 4(a)(1) of the Act: (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. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Threats evaluated for the wolverine in the contiguous United States include climate change (Factors A and E), effects from roads (Factors A and E), disturbance due to winter recreational activity (Factors A and E), other human disturbance (Factors A and E), effects from wildland fire (Factor A), disease (Factor C), predation (Factor C), overutilization (trapping) (Factor B), genetic diversity (Factor E), and small population effects (Factor E). We found that habitat loss as a result of climate change is the primary threat to the wolverine's future viability in the contiguous United States. We expect climate change to exacerbate effects from multi-lane roads, backcountry winter recreation, and human development, all of which could then impact genetic diversity and small population dynamics. A summary of the threats affecting the North American wolverine in the contiguous United States is presented below; for a full description of our evaluation of the effects of these stressors, refer to the wolverine SSA report (Service 2018, pp. 57–101) and the 2023 wolverine SSA report addendum (Service 2023, pp. 30–47).

*Climate Change:* The wolverine's evolutionary and phylogeographic history suggest a species adapted to cold and snowy climate conditions (Fisher et al. 2022, p. 7; Service 2023, pp. 24–25). The wolverine is a snow-adapted, cold climate animal in its physiology, morphology (Telfer and Kelsall 1984, p. 1,830), behavior, and habits. Wolverines have been classified as a “chionophile” or those animals with adaptations for snow (e.g., increased surface area on feet, pelt characteristics) (see definitions in Pruitt 1959, p. 172; Cathcart 2014, p. 22). We find that impacts from climate change (increasing temperatures and decreasing snowpack) have the largest potential to influence the North American wolverine's population viability in the future.

To inform our assessment of the North American wolverine's status in the contiguous United States, we updated our previous climate change analysis, the details of which are summarized in

the wolverine SSA report addendum (Service 2023, pp. 47–59). The spatial expansion to our climate change analysis is a major improvement from the snow projections used in our 2018 SSA report, which focused only on Rocky Mountain National Park (Colorado) and Glacier National Park (Montana). We now focus on five modeling domains that overlap with occupied and potential wolverine habitat in the contiguous United States across latitudinal, longitudinal, and elevation gradients: (1) Cascades (Washington); (2) Northern Rocky West (Washington, Idaho, and Montana); (3) Northern Rocky (Idaho and Montana); (4) Mid-Rocky (Idaho, Montana, and Wyoming); and (5) Southern Rocky (Colorado and New Mexico) (Service 2023, p. 49). Central Idaho was not modeled due to constraints of time and resources. In our updated climate assessment, we use a timeframe out to year 2100 for assessing future effects to the North American wolverine's viability from climate change and other threats. Beyond 2100, climate modeling uncertainty increases substantially due to the inability to predict human behavior, policy changes, and, by extension, future greenhouse gas emissions. Our previous assessment in the October 13, 2020, withdrawal document (85 FR 64618) looked at a timeframe of 38 to 50 years into the future. We find that end of century is a reasonable timeframe to consider, as it includes the potential for observing these effects and the wolverine's responses over several generations of the wolverine.

Two scenarios were chosen from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report to bracket the uncertainty regarding future greenhouse gas emission scenarios (Tebaldi et al. 2021, p. 258). The two emission scenarios used in the analyses are referred to as SSP2–4.5 and SSP5–8.5; SSPs replace representative concentration pathways (RCPs) from prior IPCC reports. The numerical suffixes (e.g., 2–4.5 and 5–8.5) represent the approximate level of radiative forcing (the change in energy flux in the atmosphere caused by natural or anthropogenic factors of climate change) in 2100 (compared to preindustrial levels) in units of watts per meter squared (W/m<sup>2</sup>). The SSP2–4.5 pathway (modest mitigation) used in this analysis is similar to the RCP 4.5 scenario used in past reports, whereas the SSP5–8.5 pathway represents one of the most pessimistic estimates of future greenhouse gas emissions, a future with no mitigation policy. The SSP5–8.5



pathway was included in this analysis to provide a lower-boundary estimate of future snow cover available for wolverines within the selected domains (OSTP 2023, p. 11). We chose a snow depth threshold of greater than or equal to 1 m (40 inches) to represent persistent spring snow cover on May 1 based on published literature, our prior analyses in the 2018 SSA, and studies indicating that den site abandonment generally occurs before May 1 (see the *Use of Dens and Denning Behavior* discussion in the *Reproduction and Growth* section of the 2018 SSA (Service 2018, pp. 25–27). There is no known snow depth threshold for successful wolverine denning on any date. However, based on historical den site melt-out dates (when there was no snow at the den sites) and hindcasted (historical) snow models for Glacier National Park, the 2018 SSA used greater than 0.5 m (20 inches) on May 1. We received criticism from some wolverine researchers that the use of the 0.5-m snow depth threshold on May 1 was not conservative enough based on prior studies (e.g., Copeland et al. 2010, entire; McKelvey et al. 2011, entire) that considered snow depth out to June. Others would argue (based on the importance of snow for denning) that snow depth at May 1 is not as important since young wolverine kits are usually out of their natal dens by mid-March (Inman 2023, pers. comm.). To address the criticism, and to acknowledge that snow is likely important to the wolverine for more life behaviors than just denning, for our updated analysis we increased the snow depth measure representing persistent snow cover to greater than or equal to 1 m (3.3 ft) but retained the May 1 end date. This provides a reasonable but more conservative estimate than we used in the 2018 SSA.

Results from this updated climate change analysis are consistent with earlier studies predicting greater snow loss at lower elevations across all domains. Similar elevational patterns were reported for Rocky Mountain and Glacier National Parks with greater reductions in future snow cover at lower elevations (Barsugli et al. 2020, pp. 8–10). This is partially explained by a greater percentage of future precipitation falling as rain due to higher temperatures, earlier snowmelt onset, and warmer conditions. Snowpack in the high country is not as affected by projected temperature increases but is likely more strongly controlled by projected precipitation changes (Barsugli et al. 2020, pp. 6–11;

Scalzitti et al. 2016, p. 5367; Sospedra-Alfonso et al. 2015, p. 4429).

The elevational distribution of historical den sites varies by latitude, with a general trend of dens being found at higher elevations the farther south they are found. For example, dens in the Northern Rocky domain are found at elevations ranging from approximately 1,500–2,400 m (4,921–7,874 ft) (Service 2023, figure 12), while dens in the Mid-Rocky domain are found from approximately 2,400–3,000 m (7,874–9,843 ft) (Service 2023, figure 13). Additional den sites outside of the modeling domains could expand these elevational bands. The majority of historical dens across the domains are located in elevational bands that are predicted to experience relatively small decreases in future snow cover at the higher denning elevations and moderate decreases for lower denning elevations. The percentage change in future snow depth threshold (greater than or equal to 1 m (3.3 ft)) on May 1 (median) for SSP2–4.5 (2076–2095) for the upper denning elevations in Northern Rocky West, Northern Rocky, and Mid-Rocky domains is predicted to be a less than 10 percent decrease, whereas the percentage change for the Cascades domain is predicted to be a less than 25 percent decrease. The percentage change in future snow depth threshold (greater than or equal to 1 m (3.3 ft)) on May 1 (median) for SSP2–4.5 (2076–2095) for the lower denning elevations in Northern Rocky is predicted to be a 10–50 percent decrease, and for Mid-Rocky is predicted to be a 10–25 percent decrease, while the percentage change for the Cascades domain is predicted to be a less than 25 percent decrease.

Elevations above historical den elevations are predicted to have small decreases (less than 10 percent) in the future area with snow depth exceeding the threshold (greater than or equal to 1 m (3.3 ft)) on May 1 (median) for SSP2–4.5 (2076–2095) across the domains and in some cases (e.g., Northern Rocky and Mid-Rocky domains), there are increases in predicted future area with snow exceeding the greater than or equal to 1 m (3.3 ft) May 1 threshold. This is driven by the increases in future precipitation expected in all five domains, and elevations with temperatures sufficiently cold enough to sustain snowfall, even with future warming. The lowest elevation areas within all domains (the lowest approximately 500 m (1,640 ft) of domains modeled) are predicted to have the greatest decreases in the future snow depth threshold (greater than or equal to 1 m (3.3 ft)) on May 1. For example, the Northern Rocky domain is predicted to

experience decreases of 50 to 100 percent at 1,000–1,500 m (3,281–4,921 ft) of elevation (Service 2023, figure 13). Similar patterns are seen in the other four domains, including predicted changes (mostly negative) in the future snow depth threshold (greater than or equal to 1 m (3.3 ft)) on May 1. While decreases are projected across the domains, the specific thresholds that could impact wolverine persistence at the population level are not known.

Central to our assessment of future conditions is the degree to which changes in persistent spring snow, other snow dynamics (e.g., volume, duration, condition, spatial and temporal variability, etc.), and other climate-related factors will impact wolverines at the population level in the contiguous United States. Key uncertainties that remain regarding these relationships include: (1) the extent to which wolverine population connectivity and gene flow will be affected by these changes; (2) the impacts of climate change on ecosystem drivers of wolverine persistence (i.e., changes in community dynamics, including prey availability and competition with other predators that might impact wolverine demographic rates); (3) the volume and duration of snow required for wolverines to successfully acquire and cache food for future use; (4) the impacts of climate change on the ability of wolverines to thermoregulate, and whether wolverines might experience any sublethal effects from changes in temperature (e.g., impacts to reproduction) (see Thiel et al. 2019, entire); (5) whether the observed associations of the wolverine's distribution with snowy and cold environments are driven by reproductive denning needs, other ecological requirements, or physiological constraints (Aubry et al. 2023, p. 16); (6) the adaptive capacity of wolverines to move to higher elevations for denning given predicted snow loss at lower elevations within their historical denning range (assuming snow is required for denning); and (7) the importance of snow and the impact of decreases in future snow within historical denning elevations on reproductive success. In summary, specific thresholds regarding snow dynamics and how changes in these factors will impact wolverines in the future at the population level remain uncertain.

That said, we know that wolverines are a species that is adapted to, and has a strong preference for, cold and snowy conditions and that these conditions occur in the contiguous United States at high elevations. As explained before,

there are uncertainties as to the exact mechanism(s) by which spring snowpack is important to wolverines or when it may become limiting. Although wolverines have been shown to den outside of spring snowpack in Canada and Scandinavia, we continue to have no evidence of this behavioral ability in the contiguous United States. Furthermore, new research on wolverine habitat use continues to reinforce that cold and snowy conditions are a strong predictor of wolverine occurrence on the landscape (Aubry et al. 2023, pp. 15–16; Carroll et al. 2020, p. 8; Fisher et al. 2022, p. 10; Glass et al. 2021, entire; Mowat et al. 2020, p. 220). Furthermore, deep, persistent snow cover has been shown to be an important predictor of successful wolverine dispersal and resulting genetic structure (Balkenhol et al. 2020, pp. 798–799). New research on food caching indicates that warming future conditions could make caching food, a year-round behavior, more difficult for wolverines (Van der Veen et al. 2020, pp. 8–10). As climate change reduces the preferred habitat conditions for wolverine, it has the potential to exacerbate other stressors discussed above including effects from roads, winter recreational activity, effects from development, low genetic diversity, and small population effects. When taken together, we have no reason to conclude that wolverines will somehow continue to have the same or better resiliency in the contiguous United States in the future when those cold and snowy conditions at high elevations are expected to decrease, with spring snowpack at denning elevations decreasing as much as 50 percent in some areas. Although we are not seeing deleterious effects of climate change on the contiguous U.S. DPS of North American wolverines currently, we expect future impacts at the population level.

**Effects from Roads:** In our 2018 SSA and the October 13, 2020, withdrawal document (85 FR 64618), we concluded that roads present a low stressor to wolverines at the individual and population level in most of the wolverine's current area of occupancy within the contiguous United States. New information on the effects of roads on the North American wolverine's distribution, density, reproduction, and connectivity and gene flow are presented below.

Since 2018, we were made aware of four wolverine mortalities from collisions with vehicles in the contiguous United States, at least three of which were males (Service 2023, p. 30). Overall, young, inexperienced male

wolverines have a greater risk of road mortality during dispersal compared to adults and immature females that are less prone to long-distance dispersal (e.g., Krebs et al. 2004, pp. 497–498). The small number of mortalities observed since 2018, if biased toward males, are unlikely to have substantial impacts to the resiliency of the DPS overall.

New studies available in southwestern Canada and the western United States since the 2018 SSA have found that North American wolverine distribution and density are negatively related to road density (Service 2023, pp. 31–32). In southwestern Canada, consistency of spring snow and road density are the two most important variables correlated with wolverine density (Clevenger 2019, p. 52; Mowat et al. 2020, p. 220). Wolverine population estimates derived from models based on snow and road density predicted that wolverine abundance would be 44 percent higher without the depressing effect of the road covariate (Clevenger 2019, p. 52; Mowat et al. 2020, p. 220). As most roads are concentrated in areas of human development at lower elevations with less snow, correlations between wolverine distribution and road density can be confounded by other collinear variables (Copeland et al. 2007, pp. 2210–2211). In southeastern British Columbia, the density of forest roads that extended into high-elevation wolverine habitat was a strong negative predictor of wolverine distribution in winter, especially for females (Kortello et al. 2019, p. 10). The most likely explanation for this negative relationship is the use of these high-elevation forest roads by snowmobilers, rather than predator avoidance or trapping pressure (Kortello et al. 2019, p. 10). Other possible explanations are increased trapping access or less abundant food resources near roads (Mowat et al. 2020, p. 224). While the statistical significance of the relationship between roads and wolverine densities has been demonstrated in some areas, the mechanisms behind this relationship require further study (Mowat et al. 2020, p. 224).

Large transportation corridors (e.g., multi-lane highways with substantial traffic volume) can have a significant impact on wolverine population connectivity and gene flow. The mechanisms for reducing connectivity and gene flow are road mortality and reduced habitat permeability (avoidance of crossing roads). Mitochondrial and nuclear DNA measures of genetic population structure found that the

Trans-Canada Highway corridor in the Canadian Rockies, as well as other natural and anthropogenic barriers to movement, fragmented the North American wolverine population by restricting female movement (Sawaya et al. 2019, pp. 621–622). This restricted movement resulted in male-biased dispersal and gene flow (Sawaya et al. 2019, pp. 621–622). This highway is approximately 150 miles north of the U.S.–Canada border, and the study area for analyzing wolverine movement across the Trans-Canada Highway was in the lower Bow River Valley, which is a human-dominated landscape containing the Trans-Canada Highway, a town with approximately 10,000 residents, a golf course, three ski areas, the Canadian Pacific Railway, and a secondary highway. This transportation corridor was not an absolute barrier to female movement (4 of 20 female wolverines crossed the highway during the study); however, females traversing the transportation corridor did not translate to gene flow (Sawaya et al. 2019, p. 622). The differences between male and female dispersal across this highway were likely due to the exacerbating effects of linear anthropogenic barriers on the strong natural tendencies for female wolverine philopatry (tendency to return to or remain near a particular area or site) (Sawaya et al. 2019, p. 623). (See *Genetic Diversity*, below, for more discussion of the effects of roads on gene flow and genetics of wolverines within the contiguous United States and genetic connectivity to Canada).

Wildlife crossing structures spanning the Trans-Canada Highway along the crest of the Continental Divide may improve wolverine connectivity across this highway. Evidence suggests that female wolverines may be starting to use wildlife crossings to cross the Trans-Canada Highway (Service 2023, p. 32). However, the efficacy of these structures in restoring gene flow has not yet been measured (Sawaya et al. 2019, p. 623). There are few wildlife crossing structures spanning major highways in the contiguous United States; a series of three under-crossings and one dedicated wildlife overpass on I-90 in the Washington Cascades (connecting the northern and southern Cascades) were completed in 2019 (Sugiarto 2022, p. 9). To date, however, no wolverines have been detected using these relatively new crossings.

Habitats in the contiguous United States outside of the known breeding distribution of wolverines, including the Sierra Nevada in California and the central Rocky Mountains in Colorado, are separated from occupied habitats by

large expanses of high-resistance habitats, anthropogenic features, and highways (e.g., Carroll et al. 2020, pp. 9–10; Bjornlie et al. 2021, pp. 116–117). While highways are not an absolute barrier to movement (wolverines have been documented crossing multi-lane highways), they can apparently limit female wolverine gene flow in some situations (e.g., Sawaya et al. 2019, pp. 621–622). The wolverine’s capacity to traverse large expanses of high-resistance habitats, anthropogenic features, and highways and naturally recolonize and establish a population in some relatively isolated habitats in the contiguous United States (e.g., Oregon Cascades, Sierra Nevada, and central Rocky Mountains) remains unclear.

Based on the best available scientific and commercial information, the effect of roads, in isolation, represents a relatively low threat to wolverines in the contiguous United States at the population level, although some individuals are affected. However, in combination with other threats discussed below, roads, in particular multi-lane, high-traffic roads, and high road density in core habitats could negatively affect the North American wolverine’s population resilience, distribution, and gene flow in the future.

*Disturbance Due to Winter Recreational Activity:* In our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618), we concluded that the effect of winter recreational activity represents a low stressor to wolverines in the contiguous United States at the individual and population levels. New information on winter recreation impacts on North American wolverines is presented below and adds significantly to our understanding of this factor as highly relevant to the DPS.

The response of North American wolverines to various levels of backcountry winter recreation (motorized and nonmotorized) was recently studied in four areas in Idaho, Montana, and Wyoming (Heinemeyer et al. 2019a, p. 8). The study found that wolverines temporarily avoided areas within their home range where winter recreation (motorized and nonmotorized) was occurring (Heinemeyer et al. 2019a, p. 16). Wolverines increasingly avoided these areas as the amount of off-road winter recreation increased, resulting in indirect habitat loss or functional degradation of moderate- or high-quality habitats in winter (Heinemeyer et al. 2019a, p. 16). However, wolverines did demonstrate the ability to maintain multi-year home ranges despite the presence of winter recreation activity

within those home ranges. Some resident animals had more than 40 percent of their home range within the footprint of winter recreation, suggesting that, at some scale, wolverines tolerate winter recreation (Heinemeyer et al. 2019a, p. 16).

Dispersed or off-road winter recreation appears to elicit more of an avoidance response than recreation along roads and groomed routes with females showing more sensitivity than males (Heinemeyer et al. 2019a, p. 15). Females exhibited more of a negative response to motorized recreation, which occurred at higher intensity across a larger footprint than did nonmotorized recreation.

In a study evaluating the strength of aerial survey metrics in predicting wolverine responses to motorized and nonmotorized backcountry winter recreation, higher recreation intensity showed stronger avoidance coefficients and were the most important modelled predictors of female wolverine absence (Heinemeyer et al. 2019b, pp. 18–20). Given the likelihood that, under climate change, both wolverines and backcountry winter recreation will be impacted by declining snow extent and depth and an abbreviated snow season, there is the potential for increased overlap between winter recreation and wolverine distribution (Heinemeyer et al. 2019a, p. 18).

The impacts of motorized and nonmotorized backcountry winter recreation on wolverines in the Nez Perce-Clearwater, Sawtooth National Recreation Area, and Salmon-Challis National Forests of Idaho were recently evaluated (Regan et al. 2020, entire). Preliminary results showed that recreational impacts, in both area and intensity, are increasing over time. In the Sawtooth-Boulder White Cloud Mountains, researchers compared the current extent of winter recreation with known historical wolverine home ranges and found that most of these home ranges contained little or no backcountry recreation at this time (Regan et al. 2020, p. 4). In contrast, recent surveys on the Payette National Forest in central Idaho revisited a portion of a previous winter recreation study and found that there had been an incremental loss of resident wolverines from 2010 to 2014, and that previously documented territories appeared to be vacant (Mack and Hagen 2022, p. 13). The authors suggest that “what was considered to be a stable core subpopulation area could, in fact, be more tenuous” and “that the change in wolverine abundance in this area might be attributed to changes in habitat quality from direct or indirect

influences including dispersed recreation,” although the cause for the decline in wolverine abundance requires further study (Mack and Hagen 2022, p. 13).

Both motorized and nonmotorized recreation can affect wolverine habitat use. Forest roads that are used by snowmobilers appear to have a strong negative correlation with wolverine distribution (Kortello 2019, p. 10). Nonmotorized recreation can also impact wolverines. Remote camera-based surveys from 2011–2020 in protected and non-protected habitat in southwestern Canada found that wolverine detection probability was strongly negatively correlated with the amount of nonmotorized human recreation (Barrueto et al. 2022, pp. 4–8). This pattern was consistent in both winter and summer, and mirrored the findings of Heinemeyer et al. (2019a, p. 18). Further research is necessary to determine the specific causal mechanisms most responsible for these declines (Barrueto et al. 2022, p. 8).

In the winter recreation studies we considered, winter recreation activities varied in the number of recreationists and types of recreation, and each study area had a unique combination of backcountry recreation including snowmobile, skiing (including snowboards), snowmobile-accessed ski/snowboard, cat-ski, heli-ski, yurt-supported skiing, and snowshoeing. Backcountry motorized and nonmotorized winter recreation that occurs in areas that do not overlap with wolverine home ranges is not expected to impact the DPS. Additionally, developed ski slopes and resorts that are already on the landscape and other developed winter recreation sites that do not occur in the backcountry are not expected to be a concern for wolverines, as wolverines are likely already avoiding these areas. Backcountry winter recreational activities that do occur in wolverine home ranges could negatively impact wolverines by displacing them from high-quality habitat. Developed ski resorts that allow for backcountry or out-of-bounds skiing in areas that overlap wolverine home ranges may also displace wolverines. Backcountry areas where wolverines reside in winter are largely difficult for recreationalists to access without snowmobiles or forest roads that facilitate access, and the intensity of recreational activity is correlated with accessibility.

Based on the best available scientific and commercial information, the effect of winter recreation activity (of greatest concern because of potential to impact denning), in isolation, represents a low

threat to North American wolverines in the contiguous United States at the population level, although some individuals are affected. However, in combination with other threats, including decreased snow availability (see *Climate Change*, above) and increased overlap with winter recreationalists in the future of climate change, winter recreation could negatively affect wolverine population resilience in the future.

**Other Human Disturbance and Development:** In our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618), we concluded that human infrastructure may affect individual wolverine behavior (e.g., avoidance) or result in the loss or modification of wolverine habitat. We further stated these effects are small or narrow in scope and scale and appear to represent a trade-off between foraging opportunities in areas that provide minimal risk of predation and avoidance of open areas and/or higher predation risk. We discuss below new information related to the impacts of human disturbance and development on North American wolverine populations.

North American wolverine density in and around a national park complex in the southern Canadian Rocky Mountains was three times higher within these national parks than outside them, increased with spring snow cover, and decreased with increasing night light intensity (a measure of human development) (Barrueto et al. 2022, p. 4). An approximately 40 percent decline in wolverine abundance was observed between 2011 and 2020, likely from one or more of the following causes: trapping, backcountry recreation, human development, and food availability (Barrueto et al. 2022, pp. 4, 6–8). This pattern is consistent with telemetry-based data that wolverines avoid infrastructure (May et al. 2006, entire; Scraftford et al. 2018, entire). Along the Front Range of the Canadian Rocky Mountains, wolverines selected areas with natural land-cover and high snow cover, and avoided anthropogenic features and heterospecific competitors (Heim et al. 2019, pp. 2499–2502). It is thought that competition from other carnivores that more readily exploit anthropogenic change may exacerbate the habitat loss and displacement impacts of such changes on North American wolverines (Heim et al. 2019, pp. 2503–2504).

Connectivity among North American wolverine habitats appears to be particularly sensitive to housing developments and other human impacts in rugged areas located between typical wolverine habitats (Balkenhol et al.

2020, p. 799). Housing density was found to be an important predictor of long-distance wolverine dispersal and population structure in the Northern Rocky Mountains (Balkenhol et al. 2020, p. 799). Even if areas between wolverine primary alpine habitats are not typically inhabited by wolverines, they may be used during dispersal and can, therefore, offer crucial pathways for gene flow across broad spatial scales (Balkenhol et al. 2020, p. 799).

The extent of the impacts of human presence and actions on the landscape have been collectively called “the human footprint” (Janzen 1998, entire). In an analysis of the human footprint in the western United States, Leu et al. (2008, p. 1125) found that the physical effect area of 14 anthropogenic features they analyzed (human habitation, interstate highways, Federal and State highways, secondary roads, railroads, irrigation canals, powerlines, linear feature densities, agricultural land, campgrounds, highway rest stops, landfills, oil and gas development, and human-induced fires) covered 13 percent of the land area in the western United States. Accounting for the indirect effects radiating out from the direct human footprint, Leu et al. (2008, p. 1125) categorized 52 percent of the western United States as having medium- or high-intensity impacts from the human footprint (both direct and indirect impacts), while low-intensity impact areas covered the remaining 48 percent of the landscape (Leu et al. 2008, pp. 1125–1127). When modeled North American wolverine core areas are overlaid across the western United States with the human footprint, less than 1 percent was in the high-intensity category, 12 percent in the medium-intensity category, and 88 percent in the low-intensity category. We also overlaid the current breeding distribution of the North American wolverine with the human footprint map and found that only 1 percent of the current breeding range was within the high-intensity category, 31 percent in the medium-intensity category, and 68 percent in the low-intensity category (Service 2023, figure 4). As expected, wolverine core areas are concentrated in high-elevation areas with little human infrastructure (Service 2023, figure 4). However, within their current breeding distribution in the contiguous United States, wolverines must navigate across lower elevation areas with greater amounts of human infrastructure to disperse from one habitat core to another (Service 2023, figure 4).

In addition to effects on wolverine density and connectivity, human infrastructure can also affect wolverines

through shifts in community dynamics that precipitate from changes in the behavior and temporal use of habitats by apex predators. Wolverines and other carnivores may shift their daily behavior patterns in response to the presence of human landscape disturbance (Frey et al. 2020, pp. 1133–1138). Indirect effects can also include range expansion of other carnivores into wolverine habitat facilitated by human infrastructure. While wolverine and coyotes are generally segregated, the probability of co-occurrence increases with the proportion of linear disturbance features (Chow-Fraser et al. 2022, p. 4). Using a study area in Alberta (Frey et al. 2020, p. 1130), the authors found that while wolverines favored areas of low disturbance (low proportion of linear features) and coyotes favored areas of high disturbance (high proportion of linear features), co-occurrence probability increased 3 times for each increase of linear feature unit (Chow-Fraser et al. 2022, p. 4). Modeling showed that competition exhibited the strongest effect on wolverine distribution, with wolverine occurrence best explained by coyote occurrence at the same sites (Chow-Fraser et al. 2022, p. 4). These results suggest that anthropogenic disturbance and resulting coyote range expansion may be contributing to wolverine population declines in the Canadian Rocky Mountains (Chow-Fraser et al. 2022, p. 6).

A recent study estimated the independent and cumulative effects of landscape features, human disturbance (distance to human settlements and roads, night light brightness, human population density), and prey availability on wolverines and other large carnivore occurrences in Fennoscandia (region in Europe that includes the Scandinavian peninsula, the Kola Peninsula, mainland Finland, and Karelia) (Milanesi et al. 2022, entire). Contrary to the other carnivores they evaluated, variation in the “permanent” occurrence of wolverines was best explained by human disturbance and the shared effect between landscape attributes and human disturbance. This same relationship was observed for “sporadic” wolverine occurrences, but with a considerably lower level of explained variance. The researchers concluded that, “the wolverine showed higher sensitivity to human disturbance compared to the other large carnivores, and spatial segregation patterns between wolverines and humans were found, as large carnivore home ranges are usually at high elevation (often covered by

snow), far from the lowlands where density of human settlements and roads is high” (Milanesi et al. 2022, p. 10). It appears that wolverines select den sites mainly away from infrastructure, indicating that successful reproduction may be influenced by human activities. However, wolverines also appear to be able to cross artificial barriers to some degree. Therefore, wolverines appear to have a relatively low tolerance of human disturbance, with an ability to exhibit more flexible behavior during dispersal in some circumstances.

Human disturbance and development effects are limited in scope and scale within the wolverine DPS’s core habitats and breeding range in the contiguous United States. However, in lower elevations and valleys bottoms between core habitats, wolverines must traverse through areas of human disturbance and infrastructure to maintain connectivity in the contiguous United States, where habitat is often fragmented. Wolverines have shown avoidance of disturbed areas and human infrastructure and a preference for habitats devoid of these features. Based on the best available scientific and commercial information, we find that human disturbance and development, especially coupled with major roads (see *Effects from Roads*, above), could limit wolverine connectivity and dispersal in the future.

*Effects from Wildland Fire:* In our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618), we found that wildland fire was neither a population- nor species-level stressor to North American wolverines in the contiguous United States. Our assessment of wildland fire effects to wolverines has not changed. Wildland fire can produce both direct and indirect effects to wildlife. Direct effects include injury and mortality, as well as escape or emigration movement away from fires (Lyon et al. 2000, pp. 17–21). Wildland fire is likely to temporarily displace wolverines, which could affect home range dynamics. Given that wolverines can travel long distances in a short period of time, individuals would be expected to move away from fire and smoke (Luensmann 2008, p. 14). In addition, because young wolverines are born in underground or otherwise sheltered dens during winter months and in locations where wildland fire risk is low due to snow cover or increased moisture (Luensmann 2008, p. 14), the potential effects of fire at that critical life stage is very low (Luensmann 2008, p. 14). Indirect effects of wildland fire can include habitat-related effects or effects to prey and competitors/predators; however, we

are unaware of empirical studies evaluating these potential effects as they relate to wolverines.

Given the diversity of habitats occupied by wolverines, their opportunistic foraging habitats and seasonal switching of food sources, their occupancy of high elevations, and their extensive mobility, wildland fire does not represent a stressor to North American wolverines in the contiguous U.S. range (Service 2018, pp. 63–64) and is not expected to have population-level impacts.

*Disease and Predation:* In our 2018 SSA, we found that disease and predation were neither population- nor species-level stressors to the North American wolverine in the contiguous United States. Our assessment of these stressors has not changed.

There has been considerable localized research on diseases and parasites in wolverines since the 2018 SSA was published; however, we lack data on the specific effects to wolverine populations. It is conceivable that disease-induced mortality could contribute to population declines, but this remains understudied south of the Arctic (Fisher et al. 2022, p. 9). The types of bacteria or parasites that could lead to disease in wolverines are still unknown (Watson 2020, pp. 62, 65). Many authors have discovered new viruses in the United States and Canada, some of which were previously unrecognized species of parasites (Sharma et al. 2020, p. 277; 2021, p. 1; Watson et al. 2020, p. 43; Bando et al. 2021, p. 1). This new information pertains to how wolverines act as primary hosts for some parasites, such as *Trichinella* spp., and how those parasites could increase infection risk to humans and other vertebrates (Sharma et al. 2021, pp. 1, 7). Considering the global coronavirus pandemic in recent years and instances of human-animal cross-infections, researchers are beginning to use genomic data to evaluate the wolverine’s susceptibility to these pathogens (Lok et al. 2022, pp. 16–18). Although no coronavirus cases have been reported in wolverines, and an initial evaluation of the wolverine’s genome to determine susceptibility to coronaviruses was inconclusive, there is potential risk of infection from their prey or from researchers handling captured wolverines that they release back into the wild (Lok et al. 2022, pp. 16, 18, 20).

Since our 2018 SSA, we found no substantive new information on predation. In North America, there was one new report of two wolverines being predated upon in the boreal ecosystem of Canada. One was the result of wolf

predation, and the other was the result of an unknown predator (Scrafford et al. 2021, p. 9).

Based on the best available scientific and commercial information, disease and predation are not threats to North American wolverines in the contiguous United States at the individual or population level.

*Overutilization for Commercial, Recreational, Scientific, or Educational Purposes:* In our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618), we concluded that overutilization does not currently represent a stressor to the wolverine in the contiguous United States at the individual, population, or species level. We also concluded that trapping in Canada had been and appeared to be sustainable, and trapping or harvesting of wolverines along the contiguous U.S.–Canada border did not represent a barrier to wolverine movement and dispersal along the international border (Service 2018, p. 71). Below, we present new information on incidental captures of wolverines in the contiguous United States, where regulated wolverine trapping remains closed (Service 2018, pp. 70–72), and new information on the effects of trapping mortality on wolverine populations in southwestern Canada. New information suggests that wolverine trapping in southwestern Canada has impacted connectivity across the international border.

Since 2012, there have been 10 nontarget wolverine captures (average = fewer than 1 per year (1/year)) in Montana, resulting in 3 mortalities (1 in a conibeare (a body gripping trap), 1 in a foothold, and 1 in a snare); the remainder were released (MFWP 2023, in litt., p. 1). In Idaho, 14 nontarget captures (0.7/year) of wolverines have occurred during licensed trapping activities, with no demonstrable trend in capture rates over the past 20 years (IDFG 2022, in litt., p. 3). Nine wolverines were incidentally trapped in Idaho between November 2017 and August 2022, with two resulting in known mortalities (IDFG 2022, in litt., pp. 5, 16–22).

The Idaho legislature revised the Idaho Code (IC) in 2021 to: (1) authorize a year-round trapping season for wolves on private property (IC 36–201(3)); (2) authorize additional methods of take previously prohibited (inclusive of the use of snares in 97 out of 99 management units) (IC 36–201(2)); (3) remove any limit to the number of wolf tags an individual may purchase (IC 36–408(1)); (4) allow a livestock or domestic animal owner to use a private contractor to kill wolves (IC 36–1107(c)); (5) allow the Idaho Wolf Depredation Control

Board to enter into agreements with private contractors, in addition to State and Federal agencies, to implement the provisions of Idaho Senate Bill 1211 (IC 22–5304(2)); and (6) direct wolf control assessments (\$110,000 annually) collected from the Idaho livestock industry to be combined with \$300,000 the State will transfer from the IDFG fund annually beginning on July 1, 2021 (IC 22–5306).

In Montana, new laws were also passed in 2021 to reduce the wolf population through, among other things: (1) authorizing the use of snares to take wolves by licensed trappers (Montana Code Annotated (MCA) 87–1–901(2)(b)); (2) allowing the Montana Fish, Wildlife, and Parks (MFWP) Commission authority to extend trapping season dates (MCA 87–1–304(8)); and, (3) allowing the reimbursement of costs incurred to harvest a wolf or wolves in Montana (MCA 87–6–214(1)(d)).

These regulation changes may increase the amount of wolf trapping and the risk of incidental trapping of wolverines because of the use of snares, extended trapping seasons, and financial incentives. However, because wolverines differ from wolves in size, distribution, and behavior, trappers use pan tension, site selection, and snare height to reduce the likelihood of incidental capture. In addition, year-round wolf trapping seasons in Idaho are limited to private lands, where there is very little core wolverine habitat. Although the wolf trapping regulations have been in effect for a limited time, we do not anticipate a significant increase in wolverine incidental trapping due to the measures Idaho and Montana are taking to limit wolverine capture. Across the contiguous U.S. range, wolverine mortality from incidental trapping has historically been very low, and States within the DPS's range are actively taking measures to limit incidental capture and mortality. Below, we present a summary of incidental trapping risk and measures to limit wolverine capture for each State within the current range in the contiguous United States.

#### California

The wolverine is listed as both a threatened species and as a fully protected mammal in California; these designations provide wolverines broad protection from being trapped, killed, or otherwise taken in the State (CDFW 2023, in litt., p. 2). Recent detections of lone animals have indicated the occasional presence of wolverines in the State (CDFW 2023, in litt., p. 2). Recreational and commercial trapping of fur-bearing and nongame animals has

been illegal in California since 2019 (CDFW 2023, in litt., p. 2). While furbearers and nongame species can be trapped for other reasons (e.g., the protection of property), existing regulations likely preclude the serious injury or mortality of incidentally captured wolverines (CDFW 2023, in litt., p. 2). The use of snares, conibear-type traps, and deadfall traps is prohibited in large areas of the State, including in the most recently estimated historical range of the wolverine (CDFW 2023, in litt., p. 2). The use of steel-jawed leghold traps is prohibited throughout the State (CDFW 2023, in litt., p. 2). All traps must be checked daily, and all captured animals that are not legal to trap should be immediately released (CDFW 2023, in litt., p. 2).

#### Colorado

Recreational trapping of wildlife in Colorado is limited to live cage traps (CPW 2023, in litt., p. 1), and any wolverines incidentally trapped could be released unharmed. However, there are currently no wolverines known to be present in Colorado, and, therefore, there should be no incidental trapping of wolverines occurring (CPW 2023, in litt., p. 1).

#### Idaho

IDFG has multiple guidelines that are shared with the trapping community to reduce the nontarget capture of wolverine (IDFG 2023, in litt.; IDFG 2022, p. 40). The guidelines, developed with the assistance of technical experts familiar with the wolverine, include recommendations on the types of traps used, trap tension, trap placement, avoiding areas with wolverine tracks observed, selecting habitats less likely to have wolverines, and contacting IDFG or a local sheriff's office to assist with the safe release of wolverines incidentally trapped. These guidelines help minimize nontarget wolverine captures (IDFG 2023, in litt., p. 3). Capture rates of wolverine during trapping activities for other species are low. In Idaho, 14 nontarget captures (0.7/year) of wolverines have occurred during licensed trapping activities, with no demonstrable trend in capture rates over the past 20 years (IDFG 2022, in litt., p. 3). Between November 2017 and August 2022, IDFG reported that nine wolverines were incidentally trapped, with two resulting in mortalities (IDFG 2022, in litt., pp. 5, 16–22).

#### Montana

Montana FWP has multiple trapping regulations that help mitigate the nontarget capture of wolverines by recreational trappers (MFWP 2023, in

litt., p. 1). The regulations include requirements for trappers to take an education course, that wolf traps must be checked every 48 hours, and that wolf trap tension and snare height are set to limit wolverine capture (MFWP 2023, in litt., p. 1). There are also a number of regulations required to mitigate the nontarget capture of the federally listed Canada lynx (*Lynx canadensis*) that are also applicable to wolverines, including the prohibition of wolf snares on public lands in lynx protected zones, which overlap much of the wolverine habitat in Montana (MFWP 2023, in litt., p. 5).

The last legal harvest season for wolverines in Montana was in 2012 (MFWP 2023, in litt., p. 1). The nontarget capture of a wolverine is very rare, and these incidents do not pose any population-level effects on wolverines (MFWP 2023, in litt., p. 1). There have been 10 nontarget wolverine captures (average = less than 1/year), resulting in 3 mortalities in Montana (MFWP 2023, in litt., p. 1). This also provides evidence of the efficacy of the trapping regulations in place to mitigate the nontarget capture of wolverines and other animals (MFWP 2023, in litt., p. 1).

#### Oregon

There is no open season for wolverine (or other protected species), and any incidental capture or other take of wolverines must be reported to the Oregon Department of Fish and Wildlife (ODFW) within 48 hours (ODFW 2023, in litt., p. 4). Regulations that also reduce any incidental captures or take include a 48-hour trap check (which limits the ability for traps to be set in the wolverine's range and allows for prompt trap set modification or removal if signs of wolverine presence are detected) and a prohibition on medium-sized and larger body-grip traps (such as the conibear trap) being set on land (ODFW 2023, in litt., p. 4). In practice, other traps successfully deployed for the capture of wolverines simply are not used by Oregon trappers (ODFW 2023, in litt., p. 4). For example, foothold traps (#4 coil springs, Minnesota Brand 750s) used for wolverine in Canada and Alaska are too large for targeted Oregon species like bobcats (*Lynx rufus*) and coyotes (ODFW 2023, in litt., p. 4). No wolverines have been incidentally captured by licensed furtakers in Oregon over the last half-century (ODFW 2023, in litt., p. 4).

#### Utah

There are no regulations specific to wolverines in Utah, but the Utah Division of Wildlife Resources (UDWR)

regulates trapping and the use of trapping devices to reduce the capture of nontargeted protected species (UDWR 2023, in litt., p. 2). Any protected wildlife found alive in a trapping device must be immediately released unharmed (UDWR 2023, in litt., p. 2). UDWR also provides trappers with multiple recommendations that can help avoid catching nontarget species in traps set for bobcats and other furbearers, including recommendations on the type of traps used, placement of traps, and baits used (UDWR 2023, in litt., p. 2).

#### Washington

Information on the wolverine is in Washington's trapping education manual, and all trappers must pass a trapper education test (or a similar one in another State) prior to obtaining their first license (Washington Department of Fish and Wildlife (WDFW) 2023, in litt., p. 2). Due to Washington's trap-type regulations banning body gripping traps, the likelihood of accidental capture of a wolverine is very unlikely, and injury or death from these traps even more unlikely (WDFW 2023, in litt., p. 2). In Washington, the most commonly trapped animal in habitats that wolverines occupy is the marten (*Martes americana*) but marten traps are too small for wolverines (even young wolverines) to be captured (WDFW 2023, in litt., p. 2). Larger cage traps that are used for bobcat and other larger animals could potentially capture a wolverine, but these are not commonly set in areas that wolverines occupy, and if a wolverine were incidentally captured, it could be released from the trap unharmed (WDFW 2023, in litt., p. 3). The past several years of trapper reports (2017–2022) do not show any records of a wolverine being trapped.

#### Wyoming

The Wyoming Game and Fish Department (WGFD) addresses the incidental capture of animals classified as protected, like wolverines, in their Furbearing Animal Hunting or Trapping Seasons Brochure (WGDF 2023, in litt., p. 4). All protected animals that are trapped shall be released unharmed and mortalities reported to the WGFD (WGDF 2023, p. 14). Large areas of Wyoming within the distribution of wolverines are closed to trapping, including Yellowstone National Park and Grand Teton National Park.

The WGFD is not aware of any wolverines trapped incidentally in Wyoming in recent history (WGDF 2023, in litt., p. 1). Trap types with the potential to capture wolverines are largely restricted to private lands, must

be partially submerged in water (where there would be low likelihood of wolverine capture), or are required to have break-away devices to limit bycatch (WGDF 2023, in litt., p. 2). Trapping that occurs in areas that overlap with wolverine habitat in Wyoming is primarily by marten trappers that use smaller cubby trap sets, and it is unlikely these would capture a wolverine (WGDF 2023, in litt., p. 2).

Since our 2018 SSA, there is substantial evidence demonstrating that direct trapping of wolverines has impacted wolverine densities in southern British Columbia and Alberta over the last decade (*e.g.*, Kortello et al. 2019, pp. 1, 10; Mowat et al. 2020, entire; Barrueto et al. 2020, p. 296; Barrueto et al. 2022, entire). In addition, there appear to be edge effects from trapping, with impacts to wolverine densities extending into protected areas in southern Canada (Barrueto et al. 2020, p. 296; Barrueto et al. 2022, p. 4). In the most expansive study of wolverine trapping and density to date—and encompassing southern British Columbia and Alberta's zone of connectivity with the Northern Rocky Mountains of the United States—wolverine trapping mortality was found to be unsustainably high at approximately 8.4 percent per year (Mowat et al. 2020, p. 221). Kill rates were higher in the southern British Columbia portion of the study area, with the best estimate of trapping mortality there approaching 10 percent per year (Mowat et al. 2020, p. 223). This contrasts with the maximum sustainable harvest of approximately 8 percent after accounting for the influence of higher trap vulnerability of juveniles and males and stochasticity in juvenile recruitment rates (Mowat et al. 2020, p. 221). Uncertainties in the stochasticity of reproduction, however, had large effects on the estimates of maximum sustainable harvest, causing it to vary between 0 and 8.1 percent (Mowat et al. 2020, p. 221). Based on their analyses, Mowat et al. (2020, p. 224) recommended reducing trapping mortality to no more than 4 percent per year (and perhaps even lower than that for an interim period) across their study area to promote wolverine population recovery. In response to the emerging information that trapping rates were unsustainable in southern British Columbia, the British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development closed a portion of the province along the U.S.-Canada border to wolverine trapping in 2020. New

research published since that closure has confirmed population declines of approximately 40 percent (approximately 20 individuals) in the wolverine population in a portion of the Canadian Rocky Mountains over the decade before the closure (Barrueto et al. 2022, p. 6).

Legal trapping of wolverines has not occurred in the contiguous United States in the past 10 years, and lethal incidental trapping of wolverines has been minimal (1 to 2 animals per year across the contiguous United States). As described above, States within the wolverine's range have implemented measures to limit the incidental trapping of wolverines during legal trapping of other wildlife. We expect that, as long as trapping is done in a manner to limit wolverine bycatch, recent changes to wolf trapping regulations in Idaho and Montana will have little effect on wolverines at a population level.

Based on a recent analysis of an area in Canada that was experiencing population declines related to overharvest, Mowat et al. (2020, p. 224) recommended reducing direct trapping mortality to no more than 4 percent per year across their study area to promote wolverine population recovery. In the contiguous United States, where there is no direct trapping, incidental trapping rates have been well below this recommended rate. If we assume there are approximately 300 wolverines in the contiguous United States and assume 2 wolverine mortalities per year from incidental trapping (a conservative estimate from the incidental trapping mortalities we know of since 2012), that would amount to only 0.67 percent of the population per year. This minimal level of loss will not significantly impact the contiguous U.S. population of North American wolverines and will not inhibit conservation of the DPS.

As noted, trapping in southern Canada appears to be having more of a negative effect on wolverine populations in Canada than previously thought. Unsustainable trapping levels in Canada could limit dispersal of individuals into the contiguous United States, where the dispersal of wolverines from southern Canada is vital to the genetic and demographic health of the U.S. wolverine population. Based on the best available scientific and commercial information, the effect of overutilization (trapping) in the contiguous United States is not a threat to wolverines at the population level because there is no trapping of wolverine allowed, and the incidence of bycatch of wolverine resulting from other lawful trapping activities is small

and not expected to impact the DPS's population levels. However, in combination with other threats that limit dispersal (roads, infrastructure development, climate change), overharvest of wolverines in southern Canada could negatively affect the wolverine's population resilience, distribution, and gene flow in the contiguous United States in the future.

**Genetic Diversity:** In our October 13, 2020, withdrawal document (85 FR 64618), we conclude that loss of genetic diversity is not a threat for wolverines in the contiguous United States now or within the foreseeable future. Since our 2018 SSA and October 13, 2020, withdrawal decision, new genetic research has become available. Below, we assess new information on genetics relevant to our status assessment of wolverines in the contiguous United States, including estimates of effective population size and measures of gene flow and population connectivity.

#### Effective Population Size in the Contiguous United States

As reported in our SSA report (Service 2018, pp. 46–47), effective population sizes ( $N_e$ ) are typically smaller than census population sizes. Scientists use the  $N_e$  concept as the number of individuals in a population that would result in the same loss of genetic diversity, inbreeding, and genetic drift if they behaved in the manner of an idealized population (equal sex ratio, random mating, all adults producing offspring, equal numbers of offspring per parent, and a constant number of breeding individuals across generations) (Frankham 1995, p. 96). The concept of effective population size relates to population viability because, as a general rule, closed populations with random mating that have effective population sizes (1) below 50 are at higher risk of inbreeding depression, and (2) below 500 are more likely to lose genetic variation important to maintaining long-term evolutionary potential. Fragmentation can further exacerbate inbreeding depression and genetic loss, while connectivity to larger source populations can alleviate the adverse effects of small effective population sizes (Frankham et al. 2014, p. 60). In addition, small, isolated populations are more vulnerable to extinction through interactions between environmental, genetic, and demographic factors (Caughley 1994, pp. 221–227).

The only available estimate of effective population size in wolverines in the contiguous United States is from the Northern Rocky Mountains

(inclusive of the Greater Yellowstone Ecosystem, Idaho, and Montana). This is where the bulk of the wolverine population in the contiguous United States resides (Service 2023, table 4). In 2009, the  $N_e$  estimate for the Northern Rocky Mountains was 35 (credible interval = 28–52), and  $N_e$  did not change significantly from 1989–2006 (Schwartz et al. 2009, p. 3226). There are no published estimates of effective population size for wolverines in the North Cascades. Therefore, we estimated the effective population size of wolverines in the North Cascades, and the result was an estimate of  $N_e = 4$  for the North Cascades (Service 2023, p. 27).

Overall, the effective population size estimates of wolverines occurring in the contiguous United States are small compared to conservation guidelines. Therefore, wolverines in the contiguous United States appear to be vulnerable to inbreeding and loss of genetic diversity when considered in isolation. However, only one or two migrants per generation are likely needed to achieve genetic population connectivity (Cegelski et al. 2006, p. 13). If populations were connected with a sufficient level of gene flow to offset the random loss of genetic variation in small populations, it would be more appropriate to evaluate the effective population size of the transboundary, interconnected population for the purposes of using conservation genetic rules-of-thumb.

#### Gene Flow Between the United States and Canada

In the contiguous United States, small, isolated wolverine populations are likely dependent on gene flow from Canada for population persistence (Cegelski et al. 2006, pp. 208–209; McKelvey et al. 2014, entire). Based on simulation analyses of gene loss, a census population of approximately 2,400 adult wolverines in the Northern Rocky Mountains and Greater Yellowstone Ecosystem would be needed to maintain 95 percent of the genetic variation over 100 wolverine generations (Cegelski et al. 2006, pp. 12–13). Because there is not likely sufficient habitat for that number of wolverines in the entire contiguous United States (Inman et al. 2013, p. 282), gene flow on the order of one or two wolverines per generation from Canada is critical to maintaining genetic diversity in wolverines in the contiguous United States (Cegelski et al. 2006, p. 13).

The best available genetic data indicate genetic structuring of populations despite some dispersal in the Northern Rocky Mountains (Cegelski

et al. 2006, pp. 204–205, 208; Sawaya et al. 2023, pp. 12–14), indicating reduced gene flow. Nuclear genetic diversity was lower in the southern periphery of the subspecies' range where the recent recolonization from Canada occurred (Sawaya et al. 2023, pp. 9–11). Differences in allele frequencies between the United States and Canada along the Rocky Mountains are observed, with some areas of overlap in wolverine populations straddling the border due to male-mediated gene flow. Females appear to be segregated near the international border due to their higher rates of philopatry than males, and their apparently greater tendencies to avoid crossing major roadways, including major highways (Highway 1 and 3) in southern British Columbia (Sawaya et al. 2023, p. 12, 17). Traffic volumes have substantially increased since these highways were opened in the 1960s (British Columbia Ministry of Transportation and Highways 2001, pp. 7–11, 16–21).

No unique contemporary maternal lineages have been detected south of the international border, which is consistent with wolverines recolonizing the contiguous United States from Canada within the last 60–70 years (Sawaya et al. 2023, pp. 2, 16–17). Substantially lower mitochondrial DNA diversity in the United States, compared to Canada, is consistent with limited contemporary female gene flow between the countries along the Northern Rocky Mountain range and the North American wolverine's relatively recent recolonization at the southern edge of their range (Sawaya et al. 2023, p. 17).

Wolverines in western Washington and southern British Columbia form a small transboundary population in the North Cascades (Aubry et al. 2023, p. 4). Wolverines in the North Cascades are isolated from other wolverine populations in the United States and Canada and likely went through a genetic bottleneck with few founders (Sawaya 2023, pers. comm.). The population has low heterozygosity (less than 0.5) and is likely experiencing some level of inbreeding (Sawaya 2023, pers. comm.). However, there are currently no indications of inbreeding depression (Sawaya 2023, pers. comm.).

#### Population Structure and Gene Flow Within Canada

In our 2018 SSA, we stated that wolverines in Canada are considered to occur as a single large group because they are easily able to move between areas of good habitat and because wolverine habitat is relatively contiguous. New scientific information now shows that certain anthropogenic



features (e.g., multi-lane highways) limit gene flow in southwestern Canada and supports previous research showing a pattern of decreasing genetic diversity in wolverines from north to south (e.g., Sawaya et al. 2019, pp. 621–623; Sawaya 2023, pers. comm.). Human infrastructure and other anthropogenic and natural barriers also have the potential to impede dispersal and affect wolverine population distribution and gene flow in Canada (Lofroth and Ott 2007, pp. 2194–2195). These impediments are more prevalent in the southern portions of Canada (e.g., Lofroth and Ott 2007, p. 2194). Additionally, the best available genetic data indicate substantial female population genetic isolation in wolverines (McKelvey et al. 2014, pp. 328–332; Schwartz et al. 2009, appendix A; Ziguoris et al. 2012, pp. 1520–1522; Sawaya et al. 2023, p. 17), with the possibility that the Trans-Canada Highway represents a “continental barrier to female wolverine movement” (Sawaya et al. 2019, p. 623). There is also new information that Highway 3 in southern British Columbia likely limits female wolverine gene flow (Sawaya et al. 2023, pp. 17). Therefore, wolverine populations in southern British Columbia and Alberta near the transboundary interface are less genetically connected to the contiguous United States than we found in our 2018 SSA.

#### Gene Flow Within the Contiguous United States

Previous studies found wolverines have a strong association with areas that have persistent spring snow cover (Copeland et al. 2010, entire). Snow depth was the most important variable for predicting genetic structure overall in a new landscape genetics study in the Northern Rockies and at smaller spatial scales (up to about 230 km between genetic samples); however, at broad spatial scales (more than 430 km between genetic samples), housing density and terrain ruggedness explained the most variability in wolverine population genetic structure (Balkenhol et al. 2020, p. 799). These data highlight the importance of maintaining dispersal corridors for wolverines outside of core habitats, as they represent critical pathways for gene flow across broad spatial scales (Balkenhol et al. 2020, p. 799).

Analyses of the mitochondrial DNA revealed regional structuring (i.e., regional grouping), with all of the samples collected in Idaho, Montana, and Wyoming assigned to Haplotype Wilson A (the most abundant haplotype in North America) and all of the

samples in Washington assigned to Haplotype Wilson C (Lukas et al. 2020, p. 846). Haplotypes are groups of genes within an organism that are inherited together from a single parent. These results are consistent with the latest transboundary genetic analysis (Sawaya et al. 2023, entire) and previous mitochondrial DNA studies showing that the Northern Rocky Mountains and North Cascades do not appear to share any contemporary haplotypes (McKelvey et al. 2014, p. 328). New information also suggests that wolverines in the Greater Yellowstone Ecosystem have relatively low genetic diversity and high genetic distance from other wolverine populations in Idaho and Montana (Sawaya et al. 2023, pp. 8–9, 15–16).

The low effective population size and low genetic diversity present is likely the result of the recent colonization of the contiguous United States by wolverines from Canada. Relatively few migrants per generation would be needed to maintain the genetic health of wolverines in the contiguous United States. New genetic information indicates that gene flow across the landscape has been impeded by various barriers to wolverine (particularly female) movement. There is currently no evidence of inbreeding depression or any deleterious genetic effects in the contiguous U.S. population. Based on the best available scientific and commercial information, the low genetic diversity present in the contiguous United States is not currently a threat to the contiguous U.S. DPS of North American wolverine at the population level. However, in combination with other threats that limit dispersal of wolverines (roads, infrastructure development, climate change, trapping in Canada), the gene flow from Canada that is critical to maintaining genetic diversity in wolverines in the contiguous United States could be compromised and lead to future deleterious genetic effects to the contiguous U.S. DPS of North American wolverine.

*Small Population Effects:* The number of North American wolverines in the contiguous United States is relatively small compared to the remainder of the range in Canada and Alaska, in large part due to limited habitat and previous persecution and unregulated trapping pressures. In our 2018 finding and October 13, 2020, withdrawal document (85 FR 64618), we considered wolverines in the contiguous United States to be genetically connected to wolverines in Canada, and that wolverines in the contiguous United States were not separated from the

larger North American wolverine population to the North (Canada and Alaska). We concluded that small population effects are not a stressor for wolverines in the contiguous United States now or within the foreseeable future.

Wolverine populations in the contiguous United States are small, fragmented, and relatively isolated from larger populations in Canada (Sawaya 2023, pers. comm.). Although male-mediated dispersal shows some level of wolverine population connectivity between the United States and Canada along the Rocky Mountains, female wolverines appear to have virtually no recent population connectivity based on genetic analyses (Sawaya 2023, pers. comm.). Small, isolated populations are more vulnerable to extinction through interactions of environmental, genetic, and demographic factors (Caughley 1994, pp. 221–227). Stochasticity in demographic rates at small population sizes causes outsized impacts to vital rates, even in a constant environment, which can greatly increase extinction risk. The repopulation of wolverines in the contiguous United States from Canada post-unregulated trapping over the last approximately 100 years has demonstrated the resiliency of the North American wolverine population to recover from extreme persecution and unprecedented direct mortality. We do not currently foresee any stochastic or catastrophic events that could result in a similar population-level effect on wolverines in the contiguous United States. However, the resiliency of the contiguous U.S. population to future catastrophic events is predicated on the ability of dispersing wolverines from Canada to repopulate the contiguous United States. As discussed above, connectivity with Canada is more limited than previously thought, especially considering the lack of female dispersal, which would be necessary for continued repopulation. Based on the best available scientific and commercial information, the small population size present in the contiguous United States is not currently a threat to wolverines at the population level. However, in combination with other threats, the small population size of wolverines in the contiguous United States could lead to a reduced ability of the population to withstand catastrophic events in the future.

#### Conservation Efforts and Regulatory Mechanisms

##### Federal Regulatory Mechanisms

Management of the wolverine and its habitat on Federal lands is crucial to

wolverine conservation, as Federal lands make up approximately 96 percent of modeled wolverine habitat, the majority of which are U.S. Forest Service lands (Service 2018, p. 103). The U.S. Forest Service manages the National Forest System lands in accordance with local land and resource management plans (Forest Plans). In 2012, the U.S. Forest Service published rules for revising Forest Plans (see 77 FR 21162, April 9, 2012, and 36 CFR part 219). The 2012 planning rule adopts a complementary ecosystem (coarse filter) and species-specific (fine filter) approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area, within U.S. Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.9). This complementary approach includes ecosystem and species-specific plan components.

In our 2018 SSA, we identified Forest Plans as important “federal mechanisms” that, in combination with State wildlife action plans, “will alleviate effects associated with potential impacts related to stressors discussed in this report.” However, in our 2018 SSA, we reviewed only four Forest Plans and did not identify in those plans any specific standards (mandatory constraints on project and activity decision-making) for wolverines.

For the wolverine SSA report addendum, we conducted a more comprehensive review of the latest Forest Plans for 20 National Forests within the current breeding range of the contiguous U.S. DPS of North American wolverine. We found a complex array of plan components aimed at achieving the 2012 planning rule’s complementary ecosystem and species-specific approach, while balancing the U.S. Forest Service’s multiple-use mandate. Some plans provided wolverine-specific guidelines, objectives, and direction to minimize effects of roads, winter recreation, and other sources of human disturbance, but we did not identify any wolverine-specific standards. The focus of wolverine-specific plan components, when they were included, was most often limited to protection of known den sites and maternal habitat during the denning season.

Course-filter protections of habitat-types and ecosystems contained in the plans will undoubtedly provide some conservation benefits to wolverines. For example, generally wolverines will benefit from wilderness area protections (calculated as 18 percent of the extent of wolverine occurrence and 41 percent of core wolverine habitats in the

western United States (Service 2018, p. 103)); limitations on development and road construction; limitations on road densities in certain areas for the grizzly bear (*Ursus arctos horribilis*) or other species; and restrictions on over-snow travel. However, quantifying these benefits outside of wilderness areas is challenging given the variability in Forest Plan standards and conservation measures across the U.S. range of the wolverine.

U.S. Forest Service regulations require National Forests to designate roads, trails, and off-road areas that are open and closed to motor vehicle use (36 CFR 212.5). In 2015, the U.S. Forest Service published a final rule indicating that it will also designate roads, trails, and areas open or closed to over-snow motor vehicle use (80 FR 4500; January 28, 2015). These designations are done on a Forest-by-Forest basis, resulting in variability in the amount of wolverine habitat impacted by these designations. For example, a recent draft environmental assessment for the Idaho Panhandle National Forests proposed to increase the area available to motorized over-snow use, resulting in projected increased impacts to primary wolverine habitat (from 39 percent currently to 52 percent under the proposed action) and maternal denning habitat (from 44 percent currently to 52 percent under the proposed action) (U.S. Forest Service 2023, p. 67). Conversely, the Gallatin National Forest reduced the amount of area open to over-snow use from 42 percent of wolverine denning habitat on the Forest to 25 percent (U.S. Forest Service 2006, chapter 3–623). This variability, and the lack of a rangewide assessment that overlays the areas of U.S. Forest Service over-snow vehicle use closures and wolverine habitat, make it difficult to characterize the effects of over-snow travel management planning on wolverines in the contiguous United States.

Several large National Parks contain core habitat for wolverines, including Yellowstone, Grand Teton, Glacier, North Cascades, and Mount Rainier National Parks. These areas are largely protected from development, although they may be impacted by winter recreation to varying degrees.

Although the Bureau of Land Management (BLM) manages relatively little land within wolverine core habitats, they do manage some of the valley bottoms between these core habitats. The wolverine is listed as a special status species by the following BLM offices: Montana/Dakotas (revision 2020), Idaho (revision 2022), and Oregon/Washington (revision 2021). The objectives of the BLM’s special-

status species policy are: (1) to conserve and/or recover species listed under the Act and the ecosystems on which they depend so that the protections of the Act are no longer needed for these species; and (2) to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing of these species under the Act. We did not identify any wolverine-specific standards in BLM resource management plans.

#### State and Provincial Regulatory Mechanisms

Wolverine trapping remains closed throughout the western United States and wolverines have retained various protected status designations in these States (Service 2023, table 10). Therefore, legal trapping is no longer an active direct stressor on wolverines in the contiguous United States. Nevertheless, the legacy effects of recent overharvest in southern Canada could negatively affect the wolverine’s population resilience, distribution, and gene flow in the contiguous United States in the future (see *Overutilization for Commercial, Recreational, Scientific or Educational Purposes*, above).

In response to studies showing that wolverine harvest was unsustainable in southeastern British Columbia (Mowat et al. 2020, entire), the provincial government closed Resource Management Region 4 (Kootenay) in the southeastern portion of British Columbia to wolverine trapping and imposed a more intensive mortality recording system in that region in the fall of 2020 (British Columbia 2022, p. 76). Regions 2 (Lower Mainland) and 8 (Okanagan) remain closed to wolverine trapping under a temporary moratorium; therefore, the entire area of British Columbia along the U.S.-Canada border is now closed to wolverine trapping (British Columbia 2022, p. 76). Wolverine trapping remains open seasonally in British Columbia Resource Management Units 3, 5, 7A, 7B, and portions of Unit 6 (British Columbia 2022, p. 76), as well as in the Rocky Mountain region of southwestern Alberta (Alberta Environment and Parks 2022, pp. 14–15).

Resource management units in southern British Columbia remain open to trapping for several other furbearers, and incidental trapping of two wolverines has been documented following the closure in the Kootenay Resource Management Unit to wolverine trapping (Vander Vennen 2020, in litt.). Given the likelihood that there is some noncompliance with reporting incidental captures, the

precise number of wolverines incidentally trapped in Canada is not known (Vander Vennen 2022, in litt.). We note here that we have no indication that noncompliance with reporting incidental captures is a concern in the contiguous United States. There are many State regulations and guidelines in place to limit incidental wolverine trapping, and we have gathered the most up-to-date information on incidental captures from States within the range for inclusion in this rule (see *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*, above).

Aside from regulated taking of wolverines, regulatory mechanisms available to States for conserving wolverines are largely related to maintaining habitat conditions that support wolverine connectivity. This is because the majority of the primary habitat cores for wolverines in the contiguous United States are on lands managed by the U.S. Forest Service. We are not aware of any other State regulatory mechanisms specific to wolverines that limit development, winter recreation, or other human disturbances in areas important to wolverine connectivity in the contiguous United States. Several States and other organizations, however, are implementing a number of voluntary monitoring or conservation measures for wolverines (see below).

#### Voluntary Conservation Measures

Western States continue to invest in monitoring wolverine occupancy. A notable effort includes that of the Western Association of Fish and Wildlife Agencies (WAFWA) Western States Wolverine Working Group, now referred to as the Forest Carnivore Subcommittee. The purpose of this subcommittee is to develop a “statistically defensible” multi-State monitoring plan for States where wolverine populations exist (Wyoming, Montana, Idaho, and Washington), to seek funding to implement the monitoring plan, to coordinate development of individual State wolverine conservation plans for States with suitable wolverine habitat, and to coordinate and prioritize research efforts (WAFWA 2022, p. 1).

In 2020, the Wyoming Game and Fish Department (WGFD) developed a wolverine management plan for the State of Wyoming that includes management and conservation strategies in Wyoming. Its goals are to: (1) promote long-term wolverine viability, (2) support expansion of wolverines into suitable habitat, (3) support multi-State monitoring efforts, and (4) support

management of the wolverine as a protected animal (WGFD 2020, p. 2).

Since 2018, Montana Fish, Wildlife and Parks has completed 10 habitat conservation projects in wolverine habitat that conserve 59,725 acres through fee title acquisition or perpetual conservation easement. A spatial toolset is now available for western Montana to help prioritize these types of acquisitions and easements (Carroll et al. 2021b, entire). Other tools such as the Crucial Areas Planning System (CAPS), a web-based landscape-scale planning tool, have also been put in place to help guide future developments that can impact wolverine habitat (MFWP 2022, in litt., p. 6).

In January 2023, the Idaho Fish and Game Commission (IFGC) adopted a revised management plan for the conservation of fisher (*Pekania pennanti*), wolverine, and Canada lynx. This plan provides updated guidance and identifies management priorities for the conservation of this suite of species over the next 6 years in Idaho. These priorities include four objectives and step-down actions related to connectivity, climate, incidental trapping, and increasing our knowledge of the relationship of wolverine denning and snow. Under the objective of addressing connectivity, IFGC proposes to continue contributing to the transboundary landscape genetics study, to develop products to support project planning and review, to develop voluntary partnerships to facilitate protections of important areas for movement and dispersal, to provide technical assistance to licensing and permitting authorities, and to maintain and to conserve wolverine populations and habitats through cooperative agreements. For the climate change objective, IFGC intends to improve modeling and monitoring. For the incidental trapping objective, IFGC intends to continue providing guidance and mandatory training to minimize nontarget capture of wolverines in traps. Lastly, to fill knowledge gaps, IFGC proposes to identify denning sites and will, if feasible, develop a model to predict denning areas to inform land management planning efforts.

The Utah Wildlife Migration Initiative, founded in 2017, identifies and protects connective corridors that allow fish and wildlife to migrate to necessary habitat areas around the State. The mission is to document, preserve, and enhance wildlife movement for species throughout Utah using state-of-the-art tracking and data management technologies, strong collaborative partnerships, and compelling outreach. The Migration Initiative and its partners

are mapping the movements of wildlife, including wolverines, so crossing structures can be placed in areas that coincide with movement corridors. Similar work is being conducted in other States and is coordinated between States.

Colorado Parks and Wildlife had previously considered reintroducing wolverines to Colorado as a nonessential experimental population to further their conservation (see 78 FR 7890; February 4, 2013). However, that proposal was withdrawn in 2014, when we withdrew our proposed listing rule (see 79 FR 47522; August 13, 2014). There is currently no formal proposal to reintroduce wolverines to Colorado.

Since 2019, Woodland Park Zoo has been coordinating the Washington Wolverine Research and Monitoring Group, a coalition of researchers and conservationists who lead wolverine projects in Washington (Woodland Park Zoo 2022, in litt.). The goal of this group is to help advance North American wolverine research and monitoring in Washington by strengthening communication and collaboration among wolverine projects Statewide. This group meets several times a year to discuss research efforts, share results and insights, and strategize around wolverine research and conservation in Washington.

#### Summary of Conservation Efforts and Regulatory Mechanisms

The various Federal, State, and provincial regulatory mechanisms and voluntary conservation efforts described above are expected to provide some benefit to North American wolverine conservation in the contiguous United States. However, these mechanisms and efforts are inadequate to protect the subspecies from the impacts of climate change in the future when the cold and snowy conditions this subspecies is adapted to are expected to decrease.

#### Summary of Current Condition

Currently, in the contiguous United States, North American wolverines are distributed in five primary core areas (identified as management regions in Inman et al. 2013), including the Northern Cascades in Washington; the Salmon-Selway in central Idaho; including the Wallowa Mountains of northeastern Oregon; the northern Continental Divide in northwest Montana; the Central Linkage region of Idaho and Montana; and the Greater Yellowstone Ecosystem (Service 2023, figure 14). Although long-distance dispersers (primarily males) occasionally reach potentially suitable habitat in other regions, known breeding

populations are currently limited to these core regions.

The precise size of the wolverine populations in the contiguous United States are currently unknown but may be small due in part to their large territories and the limited amount of available habitat in the contiguous United States. Estimates based on extrapolations of densities and suitable habitat suggest there could have been approximately 318 wolverines (95 percent CI = 249–926) in the contiguous United States more than a decade ago (Inman et al. 2013, p. 282). The best available estimates of effective population size of wolverines in the contiguous U.S. portions of the Northern Rocky Mountains and North Cascades are likely fewer than 50 combined (Schwartz et al. 2009, p. 3226).

We evaluated previously modeled wolverine primary habitat in the contiguous United States (Inman et al. 2013, entire) and estimated that 96 percent of this area is owned or managed by Federal agencies and 41 percent of this area is located in designated wilderness areas (Service 2018, p. 72). Within Idaho, Montana, Washington, and Wyoming, non-spatial occupancy model estimates were slightly lower in 2021–2022 (mean occupancy = 0.33; 95 percent CI 0.21–0.34) compared to 2016–2017 (mean occupancy = 0.27, 95 percent CI 0.27–0.39), but with overlapping confidence intervals (Mosby et al. 2023, p. 4; Service 2023, table 2). Despite overlapping confidence intervals, Bayesian analysis revealed an 85 percent chance that the occupancy estimate from 2021–2022 was outside the 95 percent CI of the 2016–2017 occupancy estimate (Mosby et al. 2023, p. 4). The percentage of surveyed cells that were occupied decreased between the sampling periods in Montana (43.7 to 17.0 percent) and Washington (34.6 to 12.5 percent), increased in Wyoming (11.5 to 25.5 percent), and remained relatively unchanged in Idaho (33.8 to 34.5 percent) (Service 2023, table 2). Spatial occupancy models by geographic area showed substantial differences between the sampling periods, with both lower and higher occupancy probabilities depending on the geographic area (Service 2023, table 3; Mosby et al. 2023, pp. 4–7). Although no wolverines were detected during the 2021–2022 survey in the sampled cells of Oregon, Utah, or Colorado (Service 2023, table 2), recent wolverine detections from other research efforts or incidental observations have been reported in Oregon, Utah, and California (Service 2023, p. 6). Despite differences

between the sampling periods, Mosby et al. (2023, p. 7) indicate that interpretations of the relationship between the two estimates be considered cautiously, and that repeated surveys into the future will be helpful in ultimately interpreting any trends in occupancy estimates. The reasons for the observed changes in occupancy by geographic region are not yet clear, and could be sampling anomalies, a real shift in distribution, or some combination of factors (Mosby et al. 2023, p. 7). This aligns with our analysis of wolverine observations from State wildlife agencies, the U.S. Forest Service, the National Park Service, Tribes, researchers, and others in the western United States from 2009–2022, which shows wolverines continue to occupy much of the core habitat within their breeding range in the contiguous United States (Service 2023, figure 2).

Contiguous U.S. contemporary wolverine populations are most likely descendants of immigrants from Canada (Service 2018, p. 49). Wolverine genetic diversity in the contiguous United States is relatively low, and there are no known unique mitochondrial DNA haplotypes present in contiguous U.S. wolverine populations (Sawaya et al. 2023, pp. 10–11). Due to the limited amount of potential wolverine habitat in the United States, connectivity and gene flow with Canada is necessary for the long-term genetic health and viability of wolverines in the western United States. In the North Cascades, new GPS tracking information shows that wolverines in western Washington and southern British Columbia form a small transboundary population (Aubry et al. 2023, p. 4), although they are isolated from other wolverine populations in the United States and Canada (Sawaya et al. 2023, pp. 9–13, 16). In the Northern Rocky Mountains, the best available data indicate genetic differences between populations despite some (mostly male-mediated) gene flow (Cegelski et al. 2006, pp. 204–205, 208; Sawaya et al. 2023, pp. 12, 17). Measurable differences have been reported in mitochondrial DNA haplotype diversity and nuclear microsatellite DNA allele frequencies between the U.S. Rocky Mountain populations and Canada populations (Cegelski et al. 2006, p. 203, Sawaya et al. 2023, pp. 12, 17). There is currently no evidence of inbreeding depression in wolverine populations in the contiguous United States; however, there is potential for inbreeding given the relatively small population sizes of wolverines here, especially in the Cascades (Sawaya 2023, pers. comm.).

Wolverine populations in much of North America are still recovering from large losses of individuals from intensive hunting and unregulated predator control in the late 1880s into the mid-20th century (Service 2018, p. 104). Trapping and poisoning from the late 1800s/early 1900s contributed to extirpation in the contiguous United States during that time, but individuals have come back (from Canada) over the years since. Trapping or hunting of wolverines remains prohibited in the United States, and mortality from incidental trapping is currently rare. Over the past century, there has been enough connectivity with Canada for wolverines to repopulate the contiguous United States. New genetic research provides further evidence of this recolonization via dispersers from Canada (Service 2023, pp. 27–28). However, connectivity in recent years is less certain.

In our October 13, 2020, withdrawal document (85 FR 64618), we determined that wolverines in the contiguous United States were connected to and an extension of the Canadian population. We now know that there are potential barriers to recent movement of wolverines to and from the contiguous United States, as evidenced by the genetic profile of wolverines in the contiguous United States (Sawaya et al. 2023, entire). Trapping in Canada near the international border was thought to be occurring at sustainable levels at the time we published our October 13, 2020, withdrawal document (85 FR 64618). In a portion of southwestern Canada encompassing a Rocky Mountain National Park complex and surrounding unprotected lands, the wolverine population declined approximately 40 percent (approximately 15–20 wolverines) from 2011–2020, likely due largely to overharvest through trapping (Barrueto et al. 2022, p. 4). This area may be an important source of dispersing individuals, and overharvest could reduce pressure for surplus wolverines, particularly females, to disperse south towards the contiguous United States. In addition, genetic analysis shows that recent dispersing individuals from Canada have been exclusively male wolverines and major highways in Southern Canada appear to limit female dispersal (Sawaya et al. 2023, pp. 12–14, 17). Also, various studies that have come available since the 2018 SSA report reinforce the understanding that wolverines avoid areas of significant human development and that development may inhibit dispersal of wolverines between home ranges and

habitat patches (Service 2023, pp. 34–36). Even though there is low genetic diversity in the contiguous U.S. population, the population is relatively small, and habitat is somewhat fragmented, there is no current evidence of inbreeding depression in contiguous U.S. wolverines and the population appears stable from an occupancy perspective.

We evaluated several threats that may be affecting wolverine populations or their habitats, including effects from roads, disturbance due to winter recreational activities, human disturbance and development, effects from wildland fire, disease and predation, overutilization, genetic diversity, small population effects, and climate change. Although these threats may affect individual wolverines, none of these threats is currently impacting wolverine resiliency (the subspecies' ability to rebound from environmental stochasticity) in the contiguous United States at a population level. In the future, the synergistic effect of some of these threats coupled with the impact of climate change (increased temperatures and decreased spring snowpack) could reduce resiliency of the contiguous U.S. population (see *Summary of Future Condition*, below), although climate change is not currently impacting the DPS. Currently, the contiguous U.S. population appears resilient because despite the potential threats analyzed, the population continues to show stability and wolverines occupy a large portion of the available habitat in the western United States, providing redundancy to withstand potential catastrophes. Wolverine breeding populations in the western United States are currently distributed across four unique ecoregions (Service 2023, figure 16). This ecoregion variation can correlate with species-wide evolutionary potential, providing representation (the ability to adapt to changes in the biological and physical environment). The North American wolverine's wide distribution across multiple ecoregions and differential exposure to various stressors also affords the DPS redundancy against catastrophic events. Overall, the current resiliency, redundancy, and representation of the contiguous U.S. population of wolverines supports current DPS viability.

#### *Summary of Future Condition*

In the wolverine SSA report addendum, we provide a comprehensive analysis of the future condition of wolverines in the contiguous United States, which we summarize here (Service 2023, pp. 61–

69). Wolverine habitat in the contiguous United States is projected to decrease and become more fragmented by the end of the century as a result of climate changes that result in increasing temperatures, earlier spring snowmelt, and loss of deep, persistent spring snowpack, primarily at lower elevations (see *Climate Change*, above). Winter recreation, which has been shown to negatively influence wolverine behavior during an important time of year when females are denning and raising young, in these diminished habitats may increase as human populations increase (U.S. Forest Service 2016, pp. 12–14). In addition, snow-dependent recreation that was formerly distributed over a wider elevation gradient will be constrained to that part of the gradient that contains quality snow into the future. Concurrently, human development may continue to expand in areas between core habitats that are important for maintaining wolverine population connectivity. While wolverines are capable of crossing areas with some human disturbance during dispersal, they also have shown some sensitivity to human development and other human impacts in rugged areas located between typical core wolverine habitats (Balkenhol et al. 2020, p. 799; Barrieto et al. 2022, p. 4). Increased human development, infrastructure, and associated anthropogenic disturbance are expected to have direct and indirect effects to wolverine populations in the contiguous United States, including reducing the number of wolverines that can be supported by available habitat, reducing the ability of wolverines to travel between patches of suitable habitat, and reducing potential dispersers from Canada. A reduction in population size and connectivity within the contiguous United States and with Canada may affect metapopulation dynamics, making it more difficult for subpopulations to recolonize currently extirpated areas and augment the genetics or demographics of adjacent subpopulations. We expect wolverine resiliency and redundancy in the contiguous United States to decline in the future.

We have identified significant uncertainties that hamper our ability to predict the scope, scale, and timing of future demographic outcomes for wolverines in the contiguous United States. These include uncertainties in mechanistic habitat relationships; census and effective population sizes; and the cumulative impact of multiple stressors on population connectivity, survival, and reproduction. Nevertheless, habitat loss through

climate change, combined with other stressors, is likely to negatively impact wolverines in the contiguous United States over the next century by reducing resiliency, redundancy, and representation. Moreover, there are few actions that are reasonably certain to occur in the future that would compensate for these negative impacts.

We evaluated the contiguous U.S. DPS of North American wolverine's ability to respond to environmental change in two ways. First, we examined core attributes of the contiguous U.S. DPS of North American wolverine's adaptive capacity in relation to standardized attributes to characterize the likelihood that wolverines in the western United States will be able to adapt to changed conditions (representation) (Thurman et al. 2020, entire; Service 2023, figure 15). Second, we evaluated the current and potential distribution of wolverines across ecological regions of the western United States given that ecological changes may vary across space and that wolverines in different ecological contexts may have dissimilar responses to these changes.

The contiguous U.S. DPS of North American wolverine's ability to adapt to climate change and other environmental changes, its adaptive capacity (representation), is key to reducing its vulnerability to these changes. Our qualitative adaptive capacity analysis for the contiguous U.S. DPS of North American wolverine was based on life-history characteristics and shows that several intrinsic factors make North American wolverines susceptible to negative outcomes from future environmental change (Service 2023, pp. 66–69). Their specialized habitat associations, low genetic diversity and population size, narrow ecological niche, low tolerance for human disturbance, and slow reproductive rate all contribute to the contiguous U.S. DPS of North American wolverine's relative difficulty in adapting in-place to future environmental change (Service 2023, table 14). Factors that may partially mitigate the contiguous U.S. DPS of North American wolverine's low adaptive capacity are their ability to disperse long distances, their relatively wide distribution in the Northern Rocky Mountains and in the North Cascades (albeit in a narrow climactic niche), and their flexible diet (Service 2023, table 14). Stressors that lessen the ability of North American wolverines to disperse, or that decrease their distribution, are likely to also degrade their adaptive capacity (redundancy), leaving them more vulnerable to environmental change.

Maintaining a species, or in this case a subspecies, across its full breadth of ecological variation can reduce extinction risk (Forester et al. 2022, p. 512). To further assess the contiguous U.S. DPS of North American wolverine's future evolutionary potential, we examined the DPS's current distribution across different ecoregion provinces. Ecoregion provinces incorporate temperature, precipitation, and vegetation data, and therefore represent landscapes with similar environmental traits (Bailey 2016, entire). Wolverine breeding populations in the western United States currently exist in 4 of 10 ecoregions where there is potential wolverine core habitat (Service 2023, figure 16). Outside of the area with known wolverine breeding, several ecoregions in the western United States contain only a relatively small area of potential wolverine core habitat. Except for the Sierran Steppe-Forest-Alpine ecoregion, wolverine breeding populations currently inhabit all the ecoregions of the western United States with large contiguous blocks of potential wolverine core habitat (Service 2023, figure 16).

Despite their relatively wide distribution among ecoregions, wolverines in the contiguous United States have low genetic diversity compared to Canadian populations and are unlikely to have evolved specialized adaptations to southern climates given their recent recolonization following extirpation (McKelvey et al. 2014, p. 332). The historical population of wolverines in the Sierra Nevada may have possessed unique evolutionary potential given the distinct genetic and taxonomic characteristics of historical museum samples; however, the wolverines in the Sierras were extirpated in the early 1900s, and their matriline was eliminated from North America (McKelvey et al. 2014, p. 332). Nevertheless, the DPS's distribution across multiple ecoregions means that parts of their range may have less exposure to future stressors. Expansion into unoccupied ecoregions where there is suitable habitat could further decrease their risk of exposure to future stressors.

Wolverine populations in the contiguous United States are currently small, fragmented, and relatively isolated from larger populations in Canada (Cegelski et al. 2006, pp. 206–207, 210; Sawaya 2023, pers. comm.). Although male-mediated dispersal shows some level of wolverine population connectivity between the United States and Canada along the Rocky Mountains, female wolverines appear to have virtually no recent population connectivity based on recent

genetic analyses (Sawaya 2023, pers. comm.). Small, isolated populations are more vulnerable to extinction through interactions between environmental, genetic, and demographic factors (Caughley 1994, pp. 221–227). Stochasticity in demographic rates at small population sizes causes outsized impacts to vital rates, even in a constant environment, which can greatly increase extinction risk. Small, isolated populations also lose genetic diversity over time, primarily through inbreeding and genetic drift, which can exacerbate extinction risk if demographic rates are further degraded through inbreeding depression (Benson et al. 2016, p. 8). Low genetic diversity can also reduce future adaptive capacity and evolutionary potential, reducing representation.

Although historical wolverine populations were likely naturally small and distributed among patches of high-elevation alpine habitats in the contiguous United States, core wolverine habitats in the contiguous United States are projected to become smaller and more fragmented in the future as a result of climate change and human disturbance. These changes may degrade the DPS's resiliency and redundancy over time, although there are uncertainties in the precise amount of degradation, how much this degradation will affect wolverine viability in the contiguous United States, or the time period over which the degradation would happen. Despite their current distribution across several ecological regions of the West, the core attributes related to adaptive capacity exhibited by wolverines may limit the ability of this DPS to adapt and persist in the face of projected environmental change. Long-distance dispersal and recolonization of some of the larger areas outside of the current breeding range of the contiguous U.S. DPS of North American wolverine (e.g., Sierra Nevada and central Rocky Mountains) could partially mitigate their susceptibility to environmental change. Dispersal between currently occupied core habitats may become more difficult in the future with anticipated increases in human development between the alpine core areas and increased backcountry winter recreation in core habitats. However, wolverine dispersal could be maintained or improved by human intervention (e.g., conserving wildlife corridors between alpine habitats, constructing highway crossing structures for wildlife).

Overall, the wolverine population in the contiguous United States is expected to decrease in resiliency, redundancy, and representation in the future. We

acknowledge that new information suggests populations in the contiguous United States may be less secure in the future than we described in our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618). We also acknowledge that uncertainty remains around gene flow between the United States and Canada, core habitats and key dispersal corridors among core areas of the contiguous United States, and the effective population size in the contiguous United States. Nevertheless, the best available information suggests that habitat loss as a result of climate change, and the resulting exacerbating effect on other stressors, is likely to decrease the viability of wolverines in the contiguous United States over the next century.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the wolverine SSA report and SSA report addendum, we have analyzed the cumulative effects of identified threats and conservation actions on the DPS. To assess the current and future condition of the DPS, we evaluate the effects of all the relevant factors that may be influencing the DPS, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire DPS, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

#### **Determination of North American Wolverine's Status**

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines an "endangered species" as a species in danger of extinction throughout all or a significant portion of its range, and a "threatened species" as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of 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 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618), we noted that during the late 1800s and early 1900s, the wolverine population declined or was extirpated in much of the contiguous United States. This decline and range contraction has been attributed to unregulated trapping and habitat degradation (Hash 1987, p. 583). However, given the high-elevation core habitats of wolverines in the contiguous United States, direct mortality through predator poisoning campaigns and unregulated trapping were likely the primary culprits.

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to North American wolverines in the contiguous United States including climate change (Factors A and E); effects from roads (Factors A and E); disturbance due to winter recreational activity (Factors A and E); other human disturbance (Factors A and E); effects from wildland fire (Factor A); disease (Factor C); predation (Factor C); overutilization (trapping) (Factor B); genetic diversity (Factor E); and small population effects (Factor E). We also assessed the adequacy of existing regulatory mechanisms (Factor D).

After evaluating threats that may be currently affecting wolverines in the contiguous United States, we have determined that although these threats may affect individual wolverines, there are no threats currently impacting wolverines in the contiguous United States at a population level. In the future, the synergistic effect of some threats coupled with the impacts of climate change (increased temperatures and decreased spring snowpack) are expected to reduce resiliency of the contiguous U.S. population, although climate change is not currently impacting wolverines occurring in the United States. Currently, the contiguous U.S. population appears resilient, as wolverines continue to consistently occupy a large portion of the available habitat in the western United States. Furthermore, wolverine breeding populations in the western United States are currently distributed across four ecoregions, which affords the DPS redundancy against catastrophic events. This ecoregion variation influences representation by potentially providing evolutionary potential to adapt to changes in the biological and physical environment. Thus, wolverines in the contiguous United States are not currently in danger of extinction throughout their range.

We expect wolverine populations in the contiguous United States to decrease in resiliency, redundancy, and representation within the foreseeable future. We consider 2100 to be the foreseeable future in this case. The main threat to wolverines is the effect of climate change on spring snow. We were able to reliably model changes in spring snow out to 2100 in our climate change analysis, and we are able to reasonably determine the wolverine's response to this threat is likely in the foreseeable future. Wolverine populations in the contiguous United States are small, fragmented, and relatively isolated from larger populations in Canada (Cegelski et al. 2006, pp. 206–207, 210; Sawaya et al. 2023, entire). Although male-mediated dispersal shows some level of wolverine population connectivity between the United States and Canada along the Rocky Mountains, female wolverines appear to have virtually no recent population connectivity based on recent genetic analyses (Sawaya et al. 2023, pp. 12–14, 17). Small, isolated populations are more vulnerable to extinction through interactions between environmental, genetic, and demographic factors (Caughley 1994, pp. 221–227). Stochasticity in demographic rates at small population sizes causes outsized impacts to vital rates, even in a constant environment, which can greatly increase extinction risk. Small, isolated populations also lose genetic diversity over time, primarily through inbreeding and genetic drift, which can exacerbate extinction risk if demographic rates are further degraded through inbreeding depression (Benson et al. 2016, p. 8). Low genetic diversity can also reduce adaptive capacity and evolutionary potential.

Although historical North American wolverine populations were likely naturally small and distributed among patches of high-elevation alpine habitats in the contiguous United States, core wolverine habitats in the United States are projected to become smaller and more fragmented in the future as the result of climate change and human disturbance. These changes are expected to degrade wolverine resiliency and redundancy over time, although there are uncertainties in the precise amount of degradation, how much this degradation will affect wolverine viability in the contiguous United States, and the precise time period over which the degradation would happen. Despite these uncertainties, the best available information indicates the impacts are such that the DPS's viability

will decrease within the foreseeable future. Although wolverines are currently distributed across several ecological regions of the U.S. West, the core attributes related to their adaptive capacity may limit the ability of this DPS to adapt and persist in the face of projected environmental change. Long-distance dispersal and recolonization of some of the larger areas outside of the current breeding range of North American wolverines (e.g., Sierra Nevada and central Rocky Mountains) could partially mitigate their susceptibility to environmental change. However, natural dispersal between currently occupied core habitats is expected to become more difficult in the future with anticipated increases in human development between the alpine core areas and increased backcountry winter recreation in core habitats.

After evaluating threats to the DPS and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that wolverine populations in the contiguous United States are less secure in the future than we described in our 2018 SSA and October 13, 2020, withdrawal document (85 FR 64618). The best available information suggests that habitat loss as a result of climate change and impacts from other stressors are likely to negatively impact the viability of wolverines in the contiguous United States over the next century. Thus, after assessing the best available information, we conclude that the contiguous U.S. DPS of North American wolverine is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

*Status Throughout a Significant Portion of Its Range*

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

Therefore, we proceed to evaluating whether the species is endangered in a

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

Following the court's holding in *Everson*, we now consider whether there are any significant portions of the North American wolverine's range in the contiguous United States where the DPS is in danger of extinction now (*i.e.*, endangered). In undertaking this analysis for the DPS, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the DPS and the threats that the DPS faces to identify portions of the range where the DPS may be endangered.

We evaluated the range of the contiguous U.S. DPS of North American wolverine to determine if the DPS is in danger of extinction now in any portion of its range. The range can theoretically be divided into portions in an infinite number of ways. We focused our analysis on portions of the range that may meet the Act's definition of an endangered species. For this DPS, we considered whether the threats or their effects on the DPS are greater in any biologically meaningful portion of the range than in other portions such that the DPS is in danger of extinction now in that portion.

We examined the following threats: climate change (Factors A and E); effects from roads (Factors A and E); disturbance due to winter recreational activity (Factors A and E); other human disturbance (Factors A and E); effects from wildland fire (Factor A); disease (Factor C); predation (Factor C); overutilization (trapping) (Factor B); genetic diversity (Factor E); and small population effects (Factor E), including cumulative effects.

The North Cascades portion of the DPS's range is the only biologically meaningful portion that we identified that could potentially have a different status than the remainder of the range. It is largely isolated by an expanse of unsuitable habitat from the larger Rocky Mountains portion of the range. All of the threats affecting wolverines are ubiquitous throughout the contiguous U.S. range; however, the low genetic diversity of the Cascades population

could potentially affect this portion more so than the rest of the range due to the apparent lack of recent genetic connectivity with Canada in that portion (Sawaya 2023, pers. comm.). The North Cascades wolverines are isolated from other wolverine populations in the United States and Canada and likely went through a genetic bottleneck with few founders (Sawaya 2023, pers. comm.). The effective population size of the North Cascades population is estimated at  $N_e = 4$ , and the population may be vulnerable to inbreeding and loss of genetic diversity when considered in isolation. Recent genetic research shows the population has low heterozygosity (less than 0.5) and may be experiencing some level of inbreeding (Sawaya 2023, pers. comm.). However, there is currently no indication that individuals or population dynamics are being negatively affected by inbreeding depression (Sawaya 2023, pers. comm.) or that wolverines in this portion are currently being more severely or differently affected by any other threats. Gene flow with wolverines in Canada in the future is important to the long-term genetic health of the North Cascades population, but this portion is not currently in danger of extinction, as the population is currently showing stability in occupancy and not expressing any deleterious effects of inbreeding.

We found no biologically meaningful portion of the DPS's range where threats are impacting individuals differently from how they are affecting the DPS elsewhere in the range, or where the biological condition of the DPS differs from its condition elsewhere in the range such that the status of the DPS in that portion differs from any other portion of the DPS's range.

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

#### *Determination of Status*

Our review of the best scientific and commercial data available indicates that

the contiguous U.S. DPS of the North American wolverine meets the Act's definition of a threatened species. Therefore, we are listing that DPS as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

#### **Available Conservation Measures**

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

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

The recovery planning process begins with development of a recovery outline made available to the public soon after a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions while a recovery plan is being developed. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) may be established to develop and implement recovery plans. The recovery planning process involves the identification of actions that are necessary to halt and reverse the species' decline by addressing the threats to its survival and recovery. The recovery plan identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (“downlisting”) or removal from protected status (“delisting”), and methods for monitoring recovery progress. Recovery plans also establish



a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery outline, draft recovery plan, final recovery plan, and any revisions will be available on our website as they are completed (<https://www.fws.gov/program/endangered-species>), or from our Ecological Services Program, Pacific Region (see **FOR FURTHER INFORMATION CONTACT**).

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

Once this DPS is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming will be eligible for Federal funds to implement management actions that promote the protection or recovery of the North American wolverine. Information on our grant programs that are available to aid species recovery can be found at: <https://www.fws.gov/service/financial-assistance>.

Please let us know if you are interested in participating in recovery efforts for the contiguous U.S. DPS of the North American wolverine. Additionally, we invite you to submit any new information on this DPS whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7 of the Act is titled, “Interagency Cooperation,” and it mandates all Federal action agencies to use their existing authorities to further the conservation purposes of the Act and to ensure that their actions are not likely to jeopardize the continued

existence of listed species or adversely modify critical habitat. Regulations implementing section 7 are codified at 50 CFR part 402.

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

Examples of discretionary actions for the contiguous U.S. DPS of the North American wolverine that may be subject to consultation procedures under section 7 are land management or other landscape-altering activities on Federal lands administered by the U.S. Forest Service, National Park Service, and Bureau of Land Management, as well as actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation. Federal agencies should coordinate with the local Service Field Office (see **FOR FURTHER INFORMATION CONTACT**) with any specific questions on section 7 consultation and conference requirements.

It is the policy of the Service, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the extent known at the time a species is listed, specific activities that will not be considered likely to result in violation of section 9 of the Act. To the extent possible, activities that will be considered likely to result in violation

will also be identified in as specific a manner as possible. The intent of this policy is to increase public awareness of the effect of a listing on proposed and ongoing activities within the range of the species. Although most of the prohibitions in section 9 of the Act apply to endangered species, sections 9(a)(1)(G) and 9(a)(2)(E) of the Act prohibit the violation of any regulation, including any regulation issued under section 4(d) of the Act, pertaining to any threatened species of fish or wildlife, or threatened species of plant, respectively. Section 4(d) of the Act directs the Secretary to promulgate protective regulations that are necessary and advisable for the conservation of threatened species. As a result, we interpret our policy to mean that, when we list a species as a threatened species, to the extent possible, we identify activities that will or will not be considered likely to result in violation of the protective regulations under section 4(d) for that species.

The following activities could potentially result in a violation of section 9 of the Act; this list is not comprehensive: Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of the listed subspecies, including import or export across State lines and international boundaries, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act.

Questions regarding whether specific activities will constitute violation of section 9 of the Act should be directed to the Service’s Pacific Regional Office (see **FOR FURTHER INFORMATION CONTACT**).

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

### Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened species. The U.S. Supreme Court has noted that statutory language similar to the language in section 4(d) of the Act authorizing the Secretary to take action that she “deems necessary and advisable” affords a large degree of deference to the agency (see *Webster v. Doe*, 486 U.S. 592, 600 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act

are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting one or more of the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld, as a valid exercise of agency authority, rules developed under section 4(d) that included limited prohibitions against takings (see *Alesea Valley Alliance v. Lautenbacher*, 2007 WL 2344927 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 WL 511479 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species, or [s]he may choose to forbid both taking and importation but allow the transportation of such species" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

The provisions of this 4(d) rule will promote conservation of the contiguous U.S. DPS of the North American wolverine by encouraging management of the landscape in ways that meet the conservation needs of the wolverine. The provisions of this rule are one of many tools that we will use to promote the conservation of the DPS.

As mentioned previously in Available Conservation Measures, section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species.

These requirements are the same for a threatened species with a species-specific 4(d) rule. For example, as with an endangered species, if a Federal agency determines that an action is "not likely to adversely affect" a threatened species that has a species-specific 4(d) rule, the agency will still need to informally consult with the Service and obtain the Service's written concurrence (50 CFR 402.13(c)). Similarly, if a Federal agency determines that an action is "likely to adversely affect" a threatened species, the action will require formal consultation and the formulation of a biological opinion (50 CFR 402.14(a)). The Service will take into account the exceptions of any 4(d) rule when issuing a biological opinion and any associated incidental take statement, but a 4(d) rule does not eliminate the Federal agency's obligation to consult under section 7(a)(2) of the Act.

We proposed a 4(d) rule along with our proposed listing rule for the contiguous U.S. DPS of the wolverine in 2013 (78 FR 7864; February 4, 2013). In the proposed 4(d) rule, we stated that we would prohibit take of any wolverine in the contiguous United States when associated with or related to trapping, hunting, shooting, collection, capturing, pursuing, wounding, killing, and trade. We further stated that, in this context, any activity where wolverines are attempted to be, or are intended to be, trapped, hunted, shot, captured, or collected, in the contiguous United States, would be prohibited. Additionally, we said that it would also be prohibited to incidentally trap, hunt, shoot, capture, pursue, or collect wolverines in the course of otherwise legal activities. We also clarified that all otherwise legal activities involving wolverines and their habitat that are conducted in accordance with applicable State, Federal, Tribal, and local laws and regulations would not be considered to be take under the proposed 4(d) rule. We identified several risk factors for the U.S. DPS of the wolverine that, in concert with climate change, may result in reduced habitat value for the DPS. These risk factors included human activities like dispersed recreation, land management activities by Federal agencies and private landowners, and infrastructure development. However, in 2013, we considered these risk factors to be small in scope and scale, and ultimately not a concern for the conservation of the DPS. As a result, we did not propose to prohibit take associated with these activities.

New information on the threats to this DPS and how these threats may affect

the future condition of wolverines in the contiguous United States (see Summary of Biological Status and Threats, above) has changed our understanding of what provisions are appropriate for the contiguous U.S. DPS of the North American wolverine. We are now tailoring the provisions of this interim 4(d) rule informed by new information. This is an interim rule, meaning that it will go into effect on the effective date specified above under **DATES**, but we are also accepting public comments on the 4(d) rule (see **DATES** and **ADDRESSES**, above). We will assess any comments we receive on the 4(d) rule and publish either an affirmation of this interim rule or a revised final rule for the 4(d) rule.

#### Provisions of the Interim 4(d) Rule

Exercising the Secretary's authority under section 4(d) of the Act, we have developed a rule that is designed to address the contiguous U.S. DPS of the North American wolverine's conservation needs. As discussed previously in Summary of Biological Status and Threats, we have concluded that the DPS is likely to become in danger of extinction within the foreseeable future primarily due to habitat loss as a result of climate change and the cumulative impacts of other, lower-level stressors, including winter recreation, development, and major roads. Section 4(d) requires the Secretary to issue such regulations as she deems necessary and advisable to provide for the conservation of each threatened species and authorizes the Secretary to include among those protective regulations any of the prohibitions that section 9(a)(1) of the Act prescribes for endangered species. We find that the protections, prohibitions, and exceptions in this 4(d) rule as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the DPS.

The protective regulations for the contiguous U.S. DPS of the North American wolverine incorporate prohibitions from section 9(a)(1) to address the threats to the DPS. Section 9(a)(1) prohibits the following activities for endangered wildlife: importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, carrying, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce. This interim 4(d) rule includes all of these prohibitions, with limited exceptions, for the DPS. With these general protective prohibitions in

place, the 4(d) rule reinforces the preservation of the DPS's populations by prohibiting activities that would incentivize the killing of wolverines for commercial gain.

As noted, this 4(d) rule generally prohibits the "take" of wolverines in the DPS. Under the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take will help preserve the DPS's remaining populations and decrease the effects to wolverines from the synergistic, negative effects from other ongoing or future threats. Therefore, we are prohibiting take of wolverines in the DPS, except for take resulting from those actions and activities specifically excepted by the 4(d) rule.

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

The interim 4(d) rule also provides for the conservation of the DPS by establishing exceptions to the general prohibition against "take" of wolverines in the DPS in support of conservation actions and otherwise lawful activities that could incidentally take a wolverine but at minimal levels not likely to have a negative impact on the DPS's conservation. We considered a variety of exceptions and determined that not all were necessary (*e.g.*, we do not include an exception for take of depredating wolverines because wolverines rarely take livestock) or would provide conservation benefits (*e.g.*, we do not include exceptions for backcountry winter recreation because recreating in these areas can be detrimental to wolverines). The exceptions to these prohibitions, described in further detail below, include certain standard exceptions, as well as purposeful take due to scientific research on wolverines, take incidental to forest management activities for the purposes of reducing the risk or severity of wildfire, and take incidental to legal trapping of species other than the wolverine that is conducted consistent with State trapping laws and regulations and that contains steps to minimize the potential for capture of wolverines.

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

under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the wolverine. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service.

#### *Standard Exceptions*

We may, under certain circumstances, issue permits to carry out one or more of the otherwise prohibited activities. These include permits issued for the following purposes: for scientific research and conservation purposes (for an activity that would not fall within the research exception for incidental take in the 4(d) rule, as described below); to enhance propagation or survival; for economic hardship; for zoological exhibition; for educational purposes; for incidental taking (for an activity not already excepted in the 4(d) rule); or for special purposes consistent with the purposes of the Act (see 50 CFR 17.32). The Act also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

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

#### *Scientific Research*

Future scientific research on North American wolverines in the contiguous United States will aid conservation and recovery by leading to a better understanding of the biology and ecology of this elusive and hard-to-study species. WAFWA, in coordination with Tribal partners, formed a multi-

State, multi-agency working group (Western States Wolverine Working Group) to design and implement the Western States Wolverine Conservation Project (WSWCP)—Coordinated Occupancy Survey (Service 2018, p. 52). The primary objectives of the WSWCP include: (1) implement a monitoring program to define a baseline wolverine distribution and genetic characteristics of the metapopulation across Montana, Idaho, Wyoming, and Washington; (2) model and maintain the connectivity of the wolverine metapopulation in the western United States; and (3) develop policies to address socio-political needs to assist wolverine population expansion as a conservation tool, including translocation of wolverines (Service 2018, p. 52). Activities associated with scientific research may include capture, anesthesia, collaring, tracking, genetic sampling, the use and baiting of camera and DNA traps, den monitoring, and aerial surveying. State agencies with approved cooperative agreements (see cooperative agreements discussion above for additional information) and the Service will not be required to obtain separate ESA permits for take associated with these actions, as we are including the exceptions at 50 CFR 17.31(b) in the 4(d) rule. To facilitate Federal agencies or federally recognized Tribes to participate in and assist with these activities, we are also including an exception that allows biologists, acting in an official capacity, from other Federal agencies or federally recognized Tribes to take wolverine for scientific or research purposes that are associated with wolverine conservation efforts, as identified by the Service, provided such taking does not result in death or permanent injury to the wolverine(s) involved. Taking that results in death or permanent injury must be reported to the appropriate U.S. Fish and Wildlife Service law enforcement office and to appropriate State and Tribal authorities.

#### *Forest Management Activities for the Purposes of Reducing the Risk or Severity of Wildfire*

As discussed in the February 4, 2013, proposed listing rule (78 FR 7864) and October 13, 2020, withdrawal document (85 FR 64618), management activities (*e.g.*, timber harvest, wildland firefighting, prescribed fire, and silviculture) can modify wolverine habitat, but this generalist species appears to be affected little by changes to the vegetative characteristics of its habitat. In addition, most wolverine breeding habitat in the contiguous United States occurs at high elevations in rugged terrain that is not conducive

to intensive forms of silviculture and timber harvest. Forest management activities for the purposes of reducing the risk or severity of wildfire are generally not a threat to wolverines in the contiguous United States.

Under this interim 4(d) rule, incidental take caused by forest vegetation management for the purpose of wildfire mitigation that promotes the long-term stability and diversity of forests will not be prohibited. Broadly, the forest vegetation and fire management activities referred to above may include, but are not limited to, silviculture practices and forest-management activities that address fuels management; insect and disease impacts; vegetation management in existing utility rights-of-way; and wildlife-habitat management, including planting seedlings or sowing seeds, mechanical cuttings as a restoration tool in stands experiencing advancing succession, full or partial suppression of fires, allowing fires to burn, and survey and monitoring of forest health. Because no forest vegetation management activities for the purposes of reducing the risk or severity of wildfire pose any threat to the North American wolverine at the DPS level, we purposefully do not specify in detail what types of these activities are included in this exception, or how, when, or where they must be conducted, as long as they are conducted in accordance with applicable law; these activities may also vary in how they are conducted across the DPS' wide range. Therefore, this interim 4(d) rule will facilitate the continuation of forest vegetation management activities because these activities pose no or minimal threats to the North American wolverine at the DPS level and result in only de minimis forms of take. Forest management can also contribute to the DPS's conservation into the future by maintaining overall forest health in and adjacent to wolverine habitat. This exception, and any relevant future section 7 consultations with Federal agencies, also allow for flexibility to accommodate specific physical conditions, resource needs, and constraints across the DPS's range.

#### Incidental Trapping

Wolverines are occasionally incidentally trapped and killed in the contiguous United States in the course of legal trapping for other species, typically wolf trapping. This occurs at low levels in a portion of the wolverine's breeding range (mainly Idaho and Montana) and does not currently represent a stressor to the wolverine in the contiguous United

States at the population or subspecies level. Since 2012, there have been 10 nontarget wolverine captures (average = fewer than 1/year) resulting in 3 mortalities in Montana (MFWP 2023, in litt., p. 1). In Idaho, 14 nontarget captures (0.7/year) of wolverines have occurred during licensed trapping activities, with no demonstrable trend in capture rates over the past 20 years (IDFG 2022, in litt., p. 3). Between November 2017 and August 2022, IDFG reported that nine wolverines were incidentally trapped, with two resulting in mortalities (IDFG 2022, in litt., pp. 5, 16–22). We have no recent reports of wolverines incidentally trapped in other States within the range during the course of legal trapping activities.

In 2021, in both Idaho and Montana, laws and regulations were enacted that may increase the amount of wolf trapping and the risk of incidental trapping of wolverines because of the use of snares, extended trapping seasons, and financial incentives (Service 2023, p. 39). However, because wolverines differ from wolves in size, distribution, and behavior, and State laws and guidelines influence trappers to use trap tension, site selection, and snare height to reduce the likelihood of incidental capture, we expect minimal effects. In addition, year-round wolf trapping seasons in Idaho are limited to private lands, where there is very little core wolverine habitat, further reducing the potential for incidental taking through trapping.

As discussed above under *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*, States within the North American wolverine's range in the contiguous United States have enacted multiple regulations and recommendations to limit incidental trapping mortality of wolverines. Additionally, the legal trapping that occurs for other species, like bobcat and marten, does not lend itself to wolverine incidental trapping due to the types of traps used, placement of those traps, and habitat in which they would be deployed. We expect incidental trapping of wolverines to continue to be very limited throughout the DPS's range.

Incidental trapping mortality of wolverines in the contiguous United States is minimal and does not impact wolverines at a population or species level. Mowat et al. (2020, p. 221) concluded the maximum sustainable harvest rate for wolverines is about 8 percent. Based on a recent analysis of an area in Canada that was experiencing population declines related to overharvest, Mowat et al. (2020, p. 224)

recommended reducing direct trapping mortality to no more than 4 percent per year across their study area to promote wolverine population recovery. In the contiguous United States, where there is no direct trapping, incidental trapping rates have been well below this recommended rate. If we assume there are approximately 300 wolverines in the contiguous United States and assume 2 wolverine mortalities per year from incidental trapping (a conservative estimate from the incidental trapping mortalities we know of since 2012), that would be only 0.67 percent of the population per year. This minimal level of loss will not significantly impact the contiguous U.S. population of North American wolverines and will not inhibit conservation of the DPS. We conclude that the overall impact of incidental trapping that is conducted in accordance with State or Tribal trapping laws and regulations and in a manner that uses best practices to minimize capture and mortality of wolverines, is not expected to negatively affect conservation and recovery efforts for the contiguous U.S. DPS of the North American wolverine. Therefore, take due to this type of trapping will not be prohibited. Take due to trapping that is not in compliance with applicable State or Tribal laws or regulations and that results in the incidental trapping of a wolverine is prohibited and subject to penalties under section 9 of the Act. Any take of wolverine from incidental trapping should be reported to the nearest U.S. Fish and Wildlife Service law enforcement office and to the appropriate State wildlife agency or Tribal wildlife authorities within 5 days of occurrence. Unharmed individuals are to be released immediately.

We anticipate that the additional take excepted by this interim 4(d) rule will only have a minimal impact on wolverine habitat and individuals in the contiguous United States. The activities associated with scientific research, forest management for the purposes of reducing the risk or severity of wildfire, and legal trapping of other species in a manner that reduces risk to wolverines are expected to result in low levels of take of individuals given the limited scope and scale of these activities.

We conclude that take of wolverines excepted by this interim 4(d) rule will be small and will not pose a significant impact on the conservation of the DPS as a whole. However, we recognize that there is some uncertainty regarding the level of take that may result and that there are other approaches and additional conservation measures that could improve the overall conservation outcome of this interim 4(d) rule. We

are seeking public comments on this interim 4(d) rule (see Public Comments Solicited on the Interim 4(d) Rule, below), and we will publish either an affirmation of this interim rule or a final revised rule after we fully consider all comments we receive.

### Need for Interim Rule

We initially proposed a 4(d) rule for the wolverine in 2013, in association with our proposal to classify the wolverine as a threatened species (78 FR 7864; February 4, 2013). We accepted comments on that 2013 proposed 4(d) rule and have considered the comments we received regarding the proposed 4(d) rule in developing this interim 4(d) rule. Thus, we engaged in notice-and-comment rulemaking, and we could have issued the 4(d) rule as a final rule rather than as an interim rule with an additional comment period. However, we have elected to issue the 4(d) rule as an interim rule and to accept public comments to ensure a robust opportunity for the public to consider the prohibitions and exceptions prescribed, while providing protections for the threatened DPS and complying with our court-ordered deadline to finalize the listing determination.

The Service considered segregating the 4(d) rule from the listing determination and issuing a revised proposed rule for notice and comment before finalizing the 4(d) rule. However, under 5 U.S.C. 553(b)(3)(B) of the Administrative Procedure Act (APA), we find good cause to proceed without reproposeing the 4(d) rule and undertaking notice and comment before finalizing the 4(d) rule. If the Secretary were to repropose a 4(d) rule and finalize it through the standard rulemaking process, we would be unable to finalize the protective regulations set forth in this interim 4(d) rule concurrently with the final listing rule for the DPS. This would result in no protections for the DPS until we complete a process to repropose and finalize a 4(d) rule. That outcome would be contrary to the public interest in this case because immediate implementation of the interim 4(d) rule when the species' listing is effective (see **DATES**, above) has the advantage of providing a conservation benefit to the North America wolverine in the contiguous United States. Under this interim 4(d) rule, the DPS will be protected by the general section 9(a)(1) prohibitions, with the aforementioned exceptions. Alternatively, another option left to the agency's discretion would be to have no prohibitions for a species determined to be threatened under the Act. However, as stated, we think that it is appropriate

to provide some protection for this DPS now so that wolverines in the United States have the best chance of surviving in the face of climate change impacts and other threats. We find that this interim 4(d) rule provides appropriate protections to promote the conservation of the DPS across its range while providing the flexibility for certain otherwise lawful activities to occur without significantly impacting the DPS or its habitat. The final rule listing the contiguous U.S. DPS of the North American wolverine as a threatened species under the Act is published as a part of this document and is effective on the date specified in **DATES**, above. To avoid any confusion arising from varying effective dates, and because we cannot establish a 4(d) rule for a species that is not yet listed, this interim 4(d) rule will also be effective on the date specified in **DATES**, above, to coincide with the effective date of the listing.

### Public Comments Solicited on the Interim 4(d) Rule

We request comments or information from other concerned Federal and State agencies, Tribes, the scientific community, or any other interested party concerning the interim 4(d) rule. With regard to the interim 4(d) rule, we particularly seek comments regarding:

(1) Whether the 4(d) rule as a whole is necessary and advisable to provide for the conservation of the contiguous U.S. DPS of the North American wolverine.

(2) Information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule.

(3) Whether we should consider any additional exceptions from the prohibitions, such as take as a result of other categories of activities beyond those described, and, if so, under what conditions and with what conservation measures, if any.

(4) Additional provisions the Service may wish to consider for a revision to the interim 4(d) rule in order to conserve, recover, and manage the DPS.

Our determination to affirm or revise the interim 4(d) rule will take into consideration all written comments and any additional information we receive. Please note that comments merely stating support for or opposition to the interim 4(d) rule without providing supporting information, although noted, will not be considered. Our final 4(d) rule may differ from this interim 4(d) rule, based on our review of all information we receive during this rulemaking proceeding. We may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new

information received. For example, we may expand the prohibitions if we conclude that the protective regulations, including those additional prohibitions, are necessary and advisable to provide for the conservation of the species. Conversely, we may establish additional exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species.

Our intent is to issue an affirmation of this interim 4(d) rule or issue a revised 4(d) rule for the contiguous U.S. DPS of the North American wolverine by December 2024.

As we state above under **DATES**, we are opening a 60-day public comment period on the interim 4(d) rule. You may submit your comments and materials concerning the interim 4(d) rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**. If you submit information via <https://www.regulations.gov>, your entire submission—including any personal identifying information—will be posted on the website.

If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on <https://www.regulations.gov>. Please include sufficient information with your comments to allow us to verify any scientific or commercial information you include.

Comments and materials we receive, as well as supporting documentation we used in preparing this rule, will be available for public inspection on <https://www.regulations.gov>, or by appointment, during normal business hours, at the Pacific Region Ecological Services Program (see **FOR FURTHER INFORMATION CONTACT**).

## III. Critical Habitat

### Background

Critical habitat is defined in section 3 of the Act as:

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

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

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

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

**Critical Habitat Determinability**

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

- (i) Data sufficient to perform required analyses are lacking, or
- (ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of “critical habitat.”

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

We reviewed the available information pertaining to the biological needs of the contiguous U.S. DPS of the North American wolverine and habitat characteristics where the DPS is located. A careful assessment of the economic impacts that may occur due to a critical habitat designation has yet to occur, and we will be working to acquire the complex information needed to perform that assessment. Therefore, due to the current lack of data sufficient to perform required analyses, we conclude that the designation of critical habitat for the DPS is not determinable at this time in accordance with 50 CFR 424.12(a)(2)(i). The Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

**Required Determinations**

*Clarity of the Rule*

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

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one

of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

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

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

*Government-to-Government Relationship With Tribes*

In accordance with the President’s memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), E.O. 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior’s manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Tribes on a government-to-government basis. In accordance with Secretary’s Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. During the development of the wolverine SSA

report addendum, we asked for information and concerns from all the federally recognized Tribes in the contiguous U.S. range of the North American wolverine in California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming. While we did not receive any information regarding the wolverine from any Tribe specific to the SSA report addendum, we remain committed to engaging with interested Tribes regarding the interim 4(d) rule, future proposed critical habitat designation, and future recovery planning for the contiguous U.S. DPS of the North American wolverine.

**References Cited**

A complete list of references cited in this rulemaking is available on the internet at <https://www.regulations.gov> and upon request from the Pacific Region Ecological Services Program (see **FOR FURTHER INFORMATION CONTACT**).

**Authors**

The primary authors of this rule are the staff members of the Fish and Wildlife Service’s Species Assessment Team and the Pacific Region Ecological Services Program.

**List of Subjects in 50 CFR Part 17**

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

**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 § 17.11, in paragraph (h), by adding an entry for “Wolverine, North American [Contiguous U.S. DPS]” to the List of Endangered and Threatened Wildlife in alphabetical order under MAMMALS to read follows:

**§ 17.11 Endangered and threatened wildlife.**

- \* \* \* \* \*
- (h) \* \* \*

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
MAMMALS				
*	*	*	*	*
Wolverine, North American [Contiguous U.S. DPS].	<i>Gulo gulo luscus</i> .....	Where found within the contiguous U.S.A.	T	88 FR [INSERT FEDERAL REGISTER PAGE WHERE THE DOCUMENT BEGINS], 11/30/2023; 50 CFR 17.40(u). <sup>4d</sup>
*	*	*	*	*

■ 3. Amend § 17.40 by adding paragraph (u) to read as follows:

**§ 17.40 Special rules—mammals.**

\* \* \* \* \*

(u) North American wolverine (*Gulo gulo luscus*), contiguous U.S. DPS.

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the contiguous U.S. distinct population segment (DPS) of the North American wolverine. Except as provided under paragraph (u)(2) of this section and §§ 17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this DPS:

- (i) Import or export, as set forth at § 17.21(b) for endangered wildlife.
- (ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.
- (iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.
- (iv) Interstate or foreign commerce in the course of a commercial activity, as

set forth at § 17.21(e) for endangered wildlife.

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

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

- (i) Conduct activities as authorized by a permit under § 17.32.
- (ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.
- (iii) Take, as set forth at § 17.31(b).
- (iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.
- (v) Take caused by scientific or research activities for wolverine undertaken by a biologist from a Federal agency other than the U.S. Fish and Wildlife Service, or a federally recognized Tribe, when acting in the course of their official duties, provided that such taking does not result in the death or permanent injury to the wolverine(s) involved and that the taking is reported to the nearest U.S. Fish and Wildlife Service law enforcement office and to the appropriate State wildlife agency or Tribal wildlife authorities. Activities

associated with scientific research may include capture, anesthesia, collaring, tracking, genetic sampling, the use and baiting of camera and DNA traps, den monitoring, and aerial surveying.

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

(A) Forest vegetation management activities for the purpose of reducing the risk or severity of wildfire.

(B) Trapping of species other than wolverine, provided that the trapping is conducted in accordance with State or Tribal trapping laws and regulations, the trapping is conducted in a manner that uses best practices to minimize the potential for capture and mortality of wolverines, and any take of wolverine is reported to the nearest U.S. Fish and Wildlife Service law enforcement office and to the appropriate State wildlife agency or Tribal wildlife authorities within 5 days of occurrence. Unharmed individuals are to be released immediately.

**Martha Williams,**

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

[FR Doc. 2023–26206 Filed 11–29–23; 8:45 am]

**BILLING CODE 4333–15–P**